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THE BUREAU OF HOME ECONOMICS

ITS HISTORY, ACTIVITIES, AND ORGANIZATION

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INSTITUTE FOR GOVERNMENT RESEARCH

SERVICE MONOGRAPHS
OF THE
UNITED STATES GOVERNMENT
No. 62

THE BUREAU OF HOME ECONOMICS

ITS HISTORY, ACTIVITIES AND ORGANIZATION

BY
PAUL V. BETTERS

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FOREWORD

The first essential to efficient administration of any enterprise is full knowledge of its present make-up and operation. Without full and complete information before them, as to existing organization, personnel, plant, and methods of operation and control, neither legislators nor administrators can properly perform their functions.

The greater the work, the more varied the activities engaged in, and the more complex the organization employed, the more imperative becomes the necessity that this information shall be available—and available in such a form that it can readily be utilized.

Of all undertakings, none in the United States, and few, if any, in the world, approach in magnitude, complexity, and importance that of the national government of the United States. As President Taft expressed it in his message to Congress of January 17, 1912, in referring to the inquiry being made under his direction into the efficiency and economy of the methods of prosecuting public business, the activities of the national government "are almost as varied as those of the entire business world. The operations of the government affect the interest of every person living within the jurisdiction of the United States. Its organization embraces stations and centers of work located in every city and in many local subdivisions of the country. Its gross expenditures amount to billions annually. Including the personnel of the military and naval establishments, more than half a million persons are required to do the work imposed by law upon the executive branch of the government.

"This vast organization has never been studied in detail as one piece of administrative mechanism. Never have the foundations been laid for a thorough consideration of the relations of all of its parts. No comprehensive effort has been made to list its multifarious activities or to group them in such a way as to present a clear picture of what the government is doing. Never has a complete description been given of the agencies through which these activities are performed. At no time has the attempt been made to study all of these activities and agencies with a view to the assignment of each activity to the agency best fitted for its performance, to the avoidance of duplication of plant and work, to the integration of all administrative agencies of the government, so far as may be practicable, into a unified organization for the most effective and economical dispatch of public business."

To lay the basis for such a comprehensive study of the organization and operations of the national government as President Taft outlined, the Institute for Government Research has undertaken the preparation of a series of monographs, of which the present study is one, giving a detailed description of each of the distinct services of the government. These studies are being vigorously prosecuted, and it is hoped that all services of the government will be covered in a comparatively brief space of time. Thereafter, revisions of the monographs will be made from time to time as need arises, to the end that they may, as far as practicable, represent current conditions.

These monographs are all prepared according to a uniform plan. They give: First, the history of the establishment and development of the service; second, its functions, described not in general terms, but by detailing its specific activities; third, its organization for the handling of these activities; fourth, the character of its plant; fifth, a compilation of, or reference to, the laws and regulations governing its operations; sixth, financial statements showing its appropriations, expenditures and other data for a period of years; and finally, a full bibliography of the sources of information, official and private, bearing on the service and its operations.

In the preparation of these monographs the Institute has kept steadily in mind the aim to produce documents that will be of direct value and assistance in the administration of public affairs. To executive officials they offer valuable tools of administration. Through them, such officers can, with a minimum of effort, inform themselves regarding the details, not only of their own services but of others with whose facilities, activities, and methods it is desirable that they should be familiar. Under present conditions services frequently engage in activities in ignorance of the fact that the work projected has already been done, or is in process of execution by other services. Many cases exist where one service could make effective use of the organization, plant or results of other services had they knowledge that such facilities were in existence. With the constant shifting of directing personnel that takes place in the administrative branch of the national government, the existence of means by which incoming officials may thus readily secure information regarding their own and other services is a matter of great importance.

To members of Congress the monograph should prove of no less value. At present these officials are called upon to legislate and appropriate money for services concerning whose needs and real problems they can secure but imperfect information. That the possession by each member of a set of monographs such as is here projected, prepared according to a uniform plan, will be a great aid to intelligent legislation and appropriation of funds can hardly be questioned.

To the public, finally, these monographs will give that knowledge of the organization and operations of their government which must be had if an enlightened public opinion is to be brought to bear upon the conduct of governmental affairs.

These studies are wholly descriptive in character. No attempt is made in them to subject the conditions described to criticisms, nor to indicate features in respect to which changes might with advantage be made. Upon administrators themselves falls responsibility for making or proposing changes which will result in the improvement of methods of administration. The primary aim of outside agencies should be to emphasize this responsibility and facilitate its fulfillment.

While the monographs thus make no direct recommendations for improvement, they cannot fail greatly to stimulate efforts in that direction. Prepared as they are according to a uniform plan, and setting forth as they do the activities, plant, organization, personnel and laws governing the several services of the government, they will automatically, as it were, reveal, for example, the extent to which work in the same field is being performed by different services, and thus furnish the information that is essential to a consideration of the great question of the better distribution and coördination of activities among the several departments, establishments, and bureaus, and the elimination of duplication of plant, organization and work. Through them it will also be possible to subject any particular feature of the administrative work of the government to exhaustive study, to determine, for example, what facilities, in the way of laboratories and other plant and equipment, exist for the prosecution of any line of work and where those facilities are located or what work is being done in any field of administration or research, such as the promotion, protection and regulation of the maritime interests of the country, the planning and execution of works of an engineering character, or the collection, compilation and publication of statistical data, or what differences of practice prevail in respect to organization, classification, appointment, and promotion of personnel.

To recapitulate, the monographs will serve the double purpose of furnishing an essential tool for efficient legislation, administration and popular control, and of laying the basis for critical and constructive work on the part of those upon whom responsibility for such work primarily rests.

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THE BUREAU OF HOME ECONOMICS

ITS HISTORY, ACTIVITIES, AND ORGANIZATION

CHAPTER I

HISTORY

The Bureau of Home Economics in the Department of Agriculture was formally organized on July 1, 1923. Prior to that time, a number of the activities now found under this Bureau had been administered by other units in the Department of Agriculture. From 1894 to 1915, nutrition investigations were carried on in the Office of Experiment Stations. When the States Relations Service was organized in 1915, the Office of Home Economics was made an integral part of that service and remained such until the general reorganization of the Department in 1923, when the Bureau of Home Economics was established. This Bureau has grown from a small investigational unit in the Office of Experiment Stations, with a staff of four or five persons, to an organization employing seventy-one persons on March 1, 1930, including various technical and professional experts.

Its functions are two-fold. The first is to study practical home problems and in this manner aid in improving and bettering living conditions. The second is to study "the relative utility and economy of agricultural products for food, clothing, and other uses in the home," which enables it to suggest and recommend plans and methods for effective home use of these products. While it is primarily a research bureau, it also devotes considerable effort to dissemination of the results of its investigations and experiments.

The Home Economics Movement. Intensive study in the field of home economics is a comparatively recent development. Yet the history of this development is interwoven with the history of agricultural education and research in the national government which reaches back to the middle of the nineteenth century when the Morrill Land Grant Act was passed in 1862.[1] A number of writers have given careful attention to this history, so that there is little need for duplicating their work in this monograph.[2] It is the purpose at the present time to confine the discussion as closely as possible to the development of home economics as a separate problem, particularly with reference to the national government's activity in this field. In this whole movement the national government has played a conspicuous part by encouraging not only the extension teaching of home economics but also the development of research in this field. In addition, it has played an influential part in the general dissemination of information on home economics.

Home problems in the United States have always existed. In the colonial period, when molasses was used in place of sugar, cooking was done in the fireplace, and the brick oven was utilized for baking, little knowledge was available to the housekeeper concerning any scientific and systematized practice of domestic science. Practically all of the household customs were either handed down "as a part of the social heritage of the group" or they were techniques learned from experience.

Nevertheless, some of the books of the period dealt with this subject. One of these, which resembles a modern cookbook in many respects, was "The Virginia Housekeeper," by Mrs. Mary Randolph. In 1800, a two-volume work entitled "Lectures on Diet and Regimen, Being a Systematic Inquiry into the Most Rational Means of Preserving Health and Prolonging Life, Together with Physical and Chemical Explanations, Calculated Chiefly for the Use of Families" was published in Boston. It was a reprint from an earlier English study. There had been a number of books on cooking and allied subjects published in England, and it is probable that some of these were circulated in the colonies before any American books appeared.

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[1] 12 Stat. L., 503.

[2] See particularly, Institute for Government Research, The Office of Experiment Stations (1924), and U. S. Department of Agriculture, Misc. Publications 15 (1928) and 36 (1929).

Catharine Beecher's "Treatise on Domestic Economy" (1841), which was published "as a part of the Massachusetts School Library," was "extensively introduced as a textbook into public schools and higher female seminaries." This work is said to have marked the "true beginning of the home economics movement." The author discussed among other things domestic economy as a branch of study, care of the health, healthful foods, healthful drinks, clothing, cleanliness, manners, economy of time, care and management of children, care of the sick, washing, starching, ironing, sewing, and care of the garden. It was followed by the "Domestic Recipe Book." Catharine Beecher also published a number of other works pertaining to domestic economy. Mrs. Beecher's books, while still of the empirical type, were more systematically arranged and were more sensible in content than previous volumes. At a later date (1857), there appeared in Webster's "The American Cyclopedia of Useful Knowledge" discussions of the selection and cooking of food, data on clothing, and other domestic topics. One of the most prolific writers in this field was Dr. William Alcott, whose books covered many housekeeping problems.

The teaching of household arts probably had its beginning in North America at the Ursuline Convents in Quebec about the middle of the seventeenth century.[3] The Female Seminary, founded by Emma Willard in 1814 at Troy, New York, was one of the early schools for women which gave attention to housewifery. Mrs. Willard believed that "housewifery might be greatly improved by being taught, not only in practice but in theory." The Female Seminary at Alton, Illinois, Mount Holyoke Seminary (1839), Elmira Female College (1855), and some few others also offered work in domestic science.

However, pioneer attempts to give school education in homemaking were few in number, and it was not until the latter part of the nineteenth century that progress in domestic economy education was made.

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[3] See *Journal of Home Economics*, Vol. II, No. 1, p. 31, February, 1910.

As early as 1866, official attention was given to the need for training in domestic economy. The report of the Commissioner of Agriculture for that year states:[4]

> One of the indispensables in the education of girls, whether daughters of farmers or not, is a thorough knowledge of household economy. This subject embraces the acquisition of a knowledge of the various processes of the culinary art; the preparation and preservation of fruits and confections; the skillful use of the needle; the care of the sick, and the culture of the kitchen garden and flower borders should not be excluded from the list. This knowledge should be not merely experimental, but should include an acquaintance with the principles which should govern the processes of each department of domestic experience. For example, it is not enough for the farmer's daughter to know how bread is made, she should understand "the chemistry of bread making." The same science teaches the effect of heat, as it is variously employed upon meats—hence the best method of cooking meats. The process of butter making involves the principles of the same science, a knowledge of which is interesting if not absolutely necessary to success in the operation. A scientific knowledge of the physiology and hygiene also has its best exemplification in the daily care of the household. Thus the commonest duties of the family will only illustrate most faithfully and fully the principles of science learned in schools, and education is made complete and symmetrical by the simultaneous culture and expansion of all the powers and functions of mind and body.

This writer goes on to say it is not extravagant to claim that "bad bread had destroyed more life than gunpowder—certainly produced more suffering."

After 1862, which witnessed the passage of the Morrill Act, home economics came to be recognized in the curricula of several land grant colleges. With the admission of women to these higher schools of learning, possibilities for training and education in the art and science of domestic economy were opened up. It may be said that the first definite progress which home economics was later to achieve had its beginnings in the establishment of the land grant colleges.

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[4] Pp. 452-54.

Iowa State College, Kansas State Agricultural College, and Illinois Industrial University (later the University of Illinois) were the first land grant schools to devote attention to household economy. Courses in cooking and sewing with some lectures on the chemistry of food and nutrition were offered at Iowa and at Kansas between 1870 and 1880. Beginning in 1874, work in home economics was given at Illinois, and the catalogue announced for 1875-76 a four-year course in domestic science which included the subjects of physiology, food and dietetics, zoology, hygiene, household aesthetics, household science, domestic economy, usages of society, political economy, and home architecture. After the land grant schools had paved the way to a certain extent, private schools introduced the subject. Among these the outstanding schools were Lasell Seminary (1877) and Wellesley College (1890), where the first real systematic attempt was made in this direction. The work was discontinued at Wellesley, however, several years later. Perhaps the strongest reason for the absence of domestic economy in a number of private schools for women was the fact that emphasis was being placed upon the type of studies pursued by men, the point being to prove that women had the "breadth, depth, and quality of mind to carry a curriculum deemed through ages as essential for man."

Other land grant institutions constantly added the subject to their curricula so that by 1905 there were thirty-six schools which had departments of home economics, and the interest in the subject became widespread. The Secretary of Agriculture was led to state in his annual report for 1897 that "among the educational movements which in recent years have engaged the attention of the public none has been received with greater favor than the attempt to introduce into the schools for girls and women some systematic teaching of the arts which are practiced in the home." In 1922, the number of institutions had grown to forty-one. Including all colleges, by 1916 there were 17,778 students of domestic economy in 195 institutions, and in 1917 home economics degrees that were conferred by these institutions totalled 773.

This rapid progress in the higher schools of learning had its counterpart in the secondary schools. As early as 1789 girls in the Boston public schools were allowed to spend school time on needlework, and in 1835 the second and third grammar grades were taught sewing. In 1885 the San Francisco High School offered domestic economy to girl students. St. Louis began the teaching of domestic science in its public schools in 1898. During the early years of the movement home economics found its way into the curricula of public schools at a rapid pace.

However, not only was interest manifested in the educational aspect of this new field but other private agencies, associations, and groups had a hand in its development. The many cooking schools throughout the country, which particularly demonstrated the necessity and desirability of good food, constituted a strong factor in this growth of interest. A brief history of these schools summarizes as follows:

> It was in 1874 that Joanne Sweeney began her work in Boston, and three years later Maria Parloa opened a cooking school. The Boston Woman's Educational Association undertook, in 1879, to support a cooking school, which, some years later (1903), was merged with Simmons College. Two cooking schools were started in 1885, supported by Mrs. Hemenway, Mrs. Shaw, and Sarah Fay. In 1888 one school was taken over by the city and the other in 1892. All grammar schools were provided for by 1893.
>
> About 1873 Juliet Corson, who was secretary of a philanthropic institution concerned with preparing women for useful occupations, became convinced of the desirability of directing female labor back into domestic affairs. In 1876, she opened a cooking school in New York City, giving lessons to cooks and housewives, as well as very young girls. In 1877, she did a great deal to popularize the idea of economy through scientific buying and preparing of foods, by the publication and circulation of fifty thousand copies of her little pamphlet on *Fifteen Cent Dinners for Working Men's Families.* After two years of marked success the cooking school was incorporated. In 1880 the Kitchen Garden Association of New York was incorporated which,

four years later, was to become the Industrial Education Association. From this, in 1888, there was organized the College for the Training of Teachers. The School of Practical Arts, of Teachers College, was separated from the other departments in 1911. The influence of the early experiments of Miss Corson is to be seen in the fact that cooking became a part of public school instruction in 1888. While dealing with New York, reference should be made to the founding of Pratt Institute in Brooklyn in 1887, where attention was given home economy from the start.

Developments similar to those of Boston and New York appeared elsewhere. Philadelphia had classes in cookery at the New Century Club in 1878. From these developed the Cooking School of Mrs. Rorer, which lasted almost a generation; and the city, encouraged by private example, adopted cooking as an elementary school study a few years later.[5]

The interest displayed by women's clubs did much to focus attention upon the movement. The reports of the General Federation of Women's Clubs for 1910 showed that

> During the last two years 720 clubs held one or more sessions on Home Economics; 371 clubs have Home Economics departments; 278 have regular lectures, demonstrations, or short courses; 257 helped materially in creating sentiment that established Home Economics in the public schools; and 104 did some kind of philanthropic or educational work in Home Economics in cities.

Mention should be made of the work of Dr. W. O. Atwater, which is discussed more in detail in the following section of this chapter, for his work in popularizing the science of nutrition provided a body of usable knowledge essential in the teaching of home economics called for by the movement. The nutrition investigations of the national government which were initiated in 1894 had their inception in his work and marked the beginning of scientific research in one branch of home economics, that of nutrition. The nutrition investigations carried out in the Office of Experiment Stations during the years 1894 to 1915, served as an impetus to research work throughout the country.

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[5] Woody, History of women's education in the United States, Vol. II, pp. 57-59 (1929).

It was to the activities of Mrs. Ellen H. Richards perhaps more than to the work of any other individual that home economics came to be recognized as a distinct field and body of knowledge. It is said of her that she "did more than any one else to bring together a great many known facts and to add a new member, home economics, to the group of subjects which a man or woman may select for serious study or for practical application."[6] Mrs. Richards was an instructor in sanitary engineering at the Massachusetts Institute of Technology. Her New England Kitchen and public school kitchens in Boston, together with the Rumford Kitchen at the Chicago Exposition in 1893, "at which food was prepared and sold on the basis of its nutritive value, did much to promote scientific teaching of food and nutrition." In these kitchens scientific principles were applied to the cooking of food on a large scale. In 1892 classes were formed in economic and sanitary cooking and branch kitchens were started in the city of Boston. Mrs. Richards was the author of many books dealing with problems of home economics, and she encouraged the development of home economics in a number of institutions.

Under her guidance the Lake Placid Conference of Home Economics was organized (1899) to study the economic and sociologic problems of the home. This Conference crystallized the domestic science movement and brought together the various and diverse interests in the field. During its existence varied topics were discussed and considered such as:

> Courses of study in Home Economics in grade schools, secondary schools, colleges and universities, professional schools and agricultural colleges; handwork for high school girls; trade schools in relation to public education; the Manhattan trade school; vacation and evening schools; mission work and kitchen-garden classes; household arts in country schools; what agricultural colleges may do for the farmer's daughter; reading courses for farmers' wives; training of teachers in Home Economics; physiological chemistry in connection with Home Economics; botany in

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[6] See The Life of Ellen H. Richards, by Caroline L. Hunt (Whitcomb and Barrows, 1912), for a more detailed statement of her work.

connection with Home Economics; teaching of Home Economics in the rural schools of Maryland; Home Economics in Canada; Teaching of Home Economics in orphan asylums, in social settlements, in country communities; English methods in practical hygiene; what New York State is doing to promote education; classification of Home Economics according to library methods; what the government is doing for domestic science teachers; the American School of Household Economics; labor problems in the household; the co-operative laundry; the Household Aid Company; simplified methods of housekeeping; attitude of housekeepers toward non-resident labor; present century housekeeping as a profession; standards of wages, hours, etc., in household service; physical development by means of housework; business opportunities for women in household crafts outside of the home; women as sanitary inspectors; journalism in relation to Home Economics; work of women's clubs in Home Economics; syllabus for study clubs on food, on shelter, on standards of living; standards of housework as modified by large numbers; embellishment and utilization of small home grounds; the architect and the housewife; the model cottage at Boulder; proteid metabolism in relation to dietary standards; diet and health; dietary work with students; food values in family menus; food adulteration; law of domestic institutions; the significance of the family in the development of the individual and of society; readjustment of values, social and economic; what shall the women do with time set free by modern methods? hospitality in the modern home; controlling ideals in the family life of the future; refined life on small incomes; effect of some social changes on the family.

The Conference which met each year until 1908 attracted the leaders, teachers, and workers in the field of home economics. It consistently urged the expansion of home economics work in the Department of Agriculture.

Out of the Lake Placid Conferences developed the American Home Economics Association, "to improve the conditions of living in the home, the institutional household and community." It was formally organized at a meeting held from December 31, 1908, to January 2, 1909. The Association publishes a professional journal, and is national in scope, having a membership in 1929 of 9726 persons, most of whom are engaged in home economics work.

When the Smith-Lever Act was passed in 1914,[7] the activity in home economics was given a tremendous impetus. It provided for coöperative agricultural extension work in connection with the land grant colleges, consisting of "giving practical demonstrations in agriculture and home economics to persons not attending or resident in said colleges in the several communities, and imparting to such persons information on said subjects through field demonstrations, publications and otherwise." One year afterwards, there were 1809 extension workers in the forty-eight states doing this type of extension work, which took the form of lectures, demonstrations, and short courses. In 1917 twenty-seven thousand women attended four hundred and fifty home economics extension schools. Home economics study clubs and home-maker's tours were organized. This work developed so rapidly that in 1923, funds from all sources expended on extension work totalled $18,821,144. Of this amount, the federal appropriation for extension activities amounted to $6,953,202.

The next stimulus given to home economics by the national government came when Congress enacted the Smith-Hughes Act,[8] which was signed by President Wilson on February 23, 1917. The act provided for coöperation "with the states in paying the salaries of teachers, supervisors, and directors of agricultural subjects, and teachers of trade, home economics, and industrial subjects, and in the preparation of teachers of agricultural trade, industrial and home economics subjects." The law set up the Federal Board for Vocational Education for the administration of the act. In 1926, there was an enrollment of nearly 180,000 in federally-aided home economics schools. Thus it may be said that the national government has by the passage of the Smith-Lever Act and the Smith-Hughes Act done much to further home economics education.[9]

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[7] 38 Stat. L., 372.

[8] 39 Stat. L., 929.

[9] For information concerning the Federal Board, see Institute for Government Research, The Federal Board for Vocational Education (1922).

The Purnell Act, enacted February 24, 1925,[10] authorized the more complete endowment of the agricultural experiment stations, including funds for home economics research. It provided that:

> The funds appropriated pursuant to this act shall be applied only to paying the necessary expenses of conducting investigations or making experiments bearing directly on the production, manufacture, preparation, use, distribution, and marketing of agricultural products and including such scientific researches as have for their purpose the establishment and maintenance of a permanent and efficient agricultural industry, and such economic and sociological investigations as have for their purpose the development and improvement of the rural home and rural life, and for printing and disseminating the results of said researches.

This recent action of the national government has enabled research activities on the part of the stations, and at the present time home economics research programs are being prosecuted in forty-four states.

Early Studies of Human Nutrition. Of the important bodies of knowledge contributory to home economics the science of nutrition was the first to be extensively developed. The early investigations prosecuted primarily by the medical profession did not, however, play an important part in influencing and guiding the kinds of food products which were consumed by the average family.

Perhaps the first study to be made in the United States on human nutrition was that prosecuted by J. R. Young in 1803 in Philadelphia. This investigation was entitled "Experimental inquiry into the principles of nutrition and the digestive process." [11] Sugar, gum, beans, and wheat were studied for their digestibility and nutritive value, with frogs and other small animals for the subjects.

Another pioneer in research who did work directly related to the nutrition aspect of home economics was William Beaumont, a doctor of medicine and surgeon in the United

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[10] 43 Stat. L., 970.

[11] "John R. Young, pioneer American physiologist, by Howard A. Kelly (Johns Hopkins Hospital Bulletin, Vol. 29, No. 330, 1918, pp. 186-91).

States Army. One of Dr. Beaumont's patients in 1822, when he was stationed at Fort Mackinac, Michigan Territory, was a man who had been wounded in the stomach by a musket. Although the wound healed, an opening into the stomach was left, and it was possible for the doctor to remove the gastric contents at any time. Beginning in 1825, Dr. Beaumont began a series "of experiments and observations on the gastric contents and the physiology of digestion" which was published in 1833. His studies are widely known as the experiments on the "man with a lid on his stomach." [12]

A general article on food was written by W. Tully entitled "The Nature and Uses of Aliment in Animal Economy" in 1810.[13] William Stith, who graduated from the medical school of the University of Pennsylvania in 1821, submitted a thesis "An Inaugural Dissertation on Digestion" which discussed "digestion, the digestive apparatus, hunger and thirst, mastication and salivary solution, deglutition, digestion in the stomach, digestion in the duodenum, and the action of the small intestines."

Prior to Dr. Beaumont, Nathan R. Smith, later professor of anatomy and physiology at the University of Vermont, wrote "A Physiological Essay on Digestion," which was published in 1825. In 1829 Dr. Caleb Ticknor submitted a thesis to the University of Pennsylvania upon "The Influence of Diet, Dress and Amusements Upon Health." Dr. Ticknor is spoken of as being "one of the early American writers who interested himself in the subject of human nutrition." He wrote that:

> No one cause of disease produces effects more injurious or extensive than unwholesome or improper diet. An article of food, if used without discretion may be productive of disease; whilst, taken properly, it may add strength and vigor to the constitution; or it may produce unpleasant or injurious effects in one person, whilst in another it may prove altogether innocuous, or rather wholesome and nourishing. These effects of diet, so discrepant in different

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[12] See Life and letters of William Beaumont, by J. S. Meyer (1912).

[13] A communication to the Medical Society of Connecticut at New Haven, 1910, Vol. 1, pp. 27-43.

individuals, or in the same individual at different times, depend, in part on idiosyncrasy, in part on the state of the system, but most of all, on the distorted and unnatural character of whatever is served up in the shape of food.

Official recognition by the national government of nutrition work came as early as 1847. The report of the Patent Office for that year carried an article in the appendix entitled "On the Proportions of Nutriment of the Means of Living." [14] Brief statements of the nutritive elements found in wheat bread, black bread, flesh, beans, peas, lentils, beets, carrots, potatoes, eggs, milk, cheese, and certain liquors were contained in the article. The evidence at hand seems to indicate that this was the first bit of attention given to human nutrition by the national government, although problems concerning the nutritive value of certain foods for animals were being considered.

In 1852, apparently the earliest study of dietaries was published in the United States by G. S. Gould, which was a "Report on the food and diet suited for almshouses, prisons, and hospitals." Additional information desired by the Board of Immigration in 1850, led them to engage Dr. Gould "to visit the best institutions in our country, and to study the system of management pursued in each, and also seek information in relation to the cheapest and most nutritious kinds of diet, with the most economical processes for their preparation." His report also contained data on sanitation and hygiene in its relation to public institution problems.

Between 1840 and 1864, physicians and other scientific investigators were making food analyses, but their importance is largely historical, as it was not until the Weende method came into use and compilations of results of analyses were made in accordance with it that satisfactory analyses were possible.

The interest of the land grant colleges and of workers in agricultural science related more to "the improvement in the culture and varieties of crops and their uses as foods for domestic animals" than to human nutrition. In respect to the former, the Commissioner of Agriculture in 1878 stated there was a "wide field for further investigation." At this time chemists in the national government were analyzing foods for domestic animals, principally in the direction of procuring data on the chemical composition of foods. Some studies of food for humans were made in connection with studies of the adulteration of food. The Division of Chemistry also conducted several important experiments directly concerned with what later became home economics.[15] One of these was a baking experiment on different types of flours for the purpose of checking a similar British experiment. Another was on the effect of cooking upon cane sugar.

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[14] See p. 540. This was a translation from German of an article by Dr. Glaser.

Other early investigations were conducted of food problems by various individuals at this time. Professor Chittenden of Yale University prosecuted a series of experiments concerning food and the earliest results were published about 1880.

The particular human nutrition inquiries which aroused the interest of the national government were those of Dr. W. O. Atwater. At the instance of Professor S. F. Baird, Secretary of the Smithsonian Institution and United States Commissioner of Fish and Fisheries, Dr. Atwater in 1877 began a study of the "chemical composition and nutritive economy of food fishes and invertebrates." It was undertaken at the chemical laboratory of Wesleyan University where Dr. Atwater was a member of the faculty. These studies, which continued until 1882, consisted of "(1) chemical analyses of fishes and invertebrates; (2) experiments upon the digestibility of fish; (3) studies of the chemical constitution of the flesh of fish." About two hundred different specimens were studied. The results which were obtained regarding the nutritive value of fish served to emphasize the necessity for other food studies, and this original study did more perhaps to bring about action on the part of the government than any other factor. The study was published in the report of the United States Commissioner of Fish and Fisheries for 1888 and was entitled "The Chemical Composition and Nutritive Values of Food-Fishes and Aquatic Invertebrates."

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[15] For a detailed analysis of the work of the Division of Chemistry see Institute for Government Research, Bureau of Chemistry and Soils (1928).

Dr. Atwater, in 1884, "was asked to prepare plans for specimens, labels, and other illustrative materials for the food collection in the United States National Museum." In connection with this task about one hundred specimens of meats were analyzed for their chemical composition. This work was done in the Wesleyan University Laboratory and was a pioneer study.[16] The Storrs Experiment Station at Storrs, Connecticut, was established in that year, and Dr. Atwater was placed in charge. By 1894 approximately five hundred specimens of food products had been analyzed in the laboratory of Wesleyan University with the coöperation of the Storrs Experiment Station. Dr. Atwater also began in 1890, at the Storrs Experiment Station, a series of dietary studies. Most of the expenses of this work were borne by individual contributors.

About the same time an extensive study of dietaries was being carried on under the direction of Carroll D. Wright, chief of the Massachusetts Bureau of Labor Statistics. The object of the investigation was to "learn something concerning the character and quantity of food actually consumed by people in different circumstances of life in different localities." A number of dietaries were collected which were submitted to Dr. Atwater for estimation of the "nutritive ingredients in the food consumed." The dietary studies previously mentioned at the Storrs Experiment Station were an extension of this particular survey. When Wright became Commissioner of the United States Department of Labor a coöperative study was begun, and by 1895 twenty-one studies of the "actual food consumption" of families had been made and reported by the Storrs station.

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[16] Published in the Report of the Storrs Experiment Station, 1891, 1892, 1893.

The work which was begun by the national government in 1894, when nutrition investigations were authorized by Congress, was a continuation of the researches mentioned above. One of the chief activities of the nutrition investigations organized and directed in the Office of Experiment Stations was the compilation of all available data on the composition of American food products.

The Study of Human Nutrition and the National Government. It was not long after the passage of the Hatch Bill on March 2, 1887,[17] which provided for the creation of agricultural experiment stations in connection with the colleges established under the act of 1862, that attention was focussed upon the study of human nutrition. The Hatch Bill in part provided as follows:

> That it shall be the object and duty of said experiment stations to conduct original researches or verify experiments on the physiology of plants and animals; the diseases to which they are severally subject, with the remedies for the same; the chemical composition of useful plants at their different stages of growth; the comparative advantages of rotative cropping as for acclimation; the analysis of soils and water; the chemical composition of manures, natural or artificial, with experiments designed to test their comparative effects on crops of different kinds; the adaptation and value of grasses and forage plants; the composition and digestibility of the different kinds of food for domestic animals; the scientific and economic questions involved in the production of butter and cheese; and such other researches or experiments bearing directly on the agricultural industry of the United States as may in each case be deemed advisable, having due regard to the varying conditions and needs of the respective States or Territories.

Thus it came about that investigations into the "composition and digestibility of the different kinds of food for domestic animals" were prosecuted even before provisions for human nutrition studies were authorized. Under this section of the act of 1887, the experiment stations made many analyses of feeding stuffs in order to judge their respective nutritive values and to ascertain the best ways to use them. By 1890, at least thirty-one of the stations were conducting experiments concerned with the production of milk, beef, and mutton.

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[17] 24 Stat. L., 440.

As a result, it was but natural that in time, there would be urgent demands for investigations of food for humans on the part of the national government. The Office of Experiment Stations had only been functioning for a short time before the Commissioner of Agriculture in his 1888 report stated as follows:

> The chief agricultural product is food, which all need. More than half of the earnings of the working people in this country, as in Europe, are and inevitably must be spent for food, and yet even the most intelligent know less about the relation existing between the nutritive value and the cost of their food than about the value as compared with the cost of their clothing, houses, fuel, or any of the other necessaries of life. This lack of popular understanding of the pecuniary economy of food, and of its physiological economy as well, results in great loss of money and injury to health. For improvement the first requisite is information, that which comes only from research. Such research might be appropriately begun by this Department and, when the lines are well-defined, advantageously carried out by the stations. The results of such inquiry would also have a most immediate and practical bearing upon the exclusively agricultural interests of the country, especially in the portions devoted to meat production. Investigation has already been carried far enough to indicate that the laboring classes in Europe are underfed, and that what they most lack to give them the bodily strength and vigor which characterize our own working people is the nutriment which is suggested in the most concentrated form in the meats, including pork, which we produce in such large excess. . . .
>
> I venture to suggest that inquiries in these directions are appropriate for this Department and for the experiment stations as well; that the initiative may properly be taken by the Department, and, when the lines are well-defined by preliminary investigations, such stations as are in condition to do so may prosecute them with advantage. A small appropriation would do a most useful work.

The following year the Director of the Office emphasized the need for such activity on the part of the Department of Agriculture.[18] He mentioned that "not a few of the best thinkers and wisest agriculturists and economists" believed that in "studying the food of animals we have no right to neglect the food of man" and "that the principles which were involved were essentially the same."

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[18] Office of Experiment Stations, Annual Report, 1889.

At this time the results of the nutrition investigations, mentioned previously, began to attract attention. The bearing of this type of research upon agricultural and household economics was evident and steps were taken to secure an appropriation to provide for this activity in the Office of Experiment Stations. In 1893, the Secretary of Agriculture reported that:

> Investigations as to food values in this country have thus far related almost exclusively to improvements in the kinds and culture of crops and to their use as food for domestic animals. It is both desirable and practical that questions relating to the use of an agricultural product as food for man should also be considered.

Up to this time the necessary work of gathering information as to the methods and results of food investigations in the United States and abroad had been undertaken by the Department. It was planned to use this as a basis for further studies by those stations which had the equipment, personnel, and resources to do the work. In order to further this type of inquiry an appropriation of $10,000 was recommended "to enable the Secretary of Agriculture to investigate and report upon the nutritive value of the various articles and commodities used for human food, with special suggestions of full, wholesome, and edible rations, less wasteful and more economical than those in common use." In addition the Secretary of Agriculture was authorized "to acquire, free of charge to him from such agricultural stations as he may select, services in the chemical analysis of such food material to an amount in cost from any one station of not exceeding $500."

This same year there appeared an article which gave additional impetus to the movement for nutrition study by the national government. It was a paper by Edward Atkinson of Boston, and was printed in the Experiment Station Record for 1893. The title was "Suggestions for the establishment of food laboratories in connection with the Agricultural Experiment Stations."[19] Mr. Atkinson put the case strongly when he said:

> Now, while there are many known data, and while our rules have been or may be established for the nutrition of beasts and of poultry, have we as yet established the data for the nutrition of mankind to anything like the same extent? Is it consistent to expend large sums of money on agricultural experiment stations to the end that the largest production of the best kind of food may be brought about at the least cost, while we utterly neglect the most important department, viz., the right of conversion of this material to the use of mankind? Do we not as a nation convert the most abundant supply of the best food material into bad feeding through our general ignorance of the processes of cooking? There is yet no popular science of cooking. There is yet no common art of cooking. There is now widespread ignorance on the whole subject, resulting in a waste which is not only unprofitable but noxious in its influence on the general health of the community.
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> The science of cooking consists in the right application of heat at the right temperature or degree of heat for the right time to the various elements of food. To what well-known popular treatise can anyone refer in which this art is taught? Of what do the rules laid down in the innumerable books on cooking mainly consist? Do they not consist in empirical instructions how to surmount the faults of the common cooking stove or range? Mankind makes use of a greater variety of food materials than any other class of animals, but there is less variation in the right nutrition of man than exists in respect to soil, the plant, or the beast. The nutrition of man is more simple, more capable of being established by rule; the variation may consist more in the quantity than the kind of food, so as to meet the demands of the work done and the season. All these variations are capable of being established under very simple rules.

Congress acted upon the recommendations embodied in the 1893 report of the Secretary of Agriculture and appropriated $10,000, which marked its first recognition for the need of human nutrition investigations. The important researches of Dr. Atwater, which had aroused considerable public interest, played an important part in this action by

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[19] Office of Experiment Stations, Bulletin 17, 1893.

Congress. The appropriation act (28 Stat. L., 271), authorizing this new type of activity specified as follows:

> To enable the Secretary of Agriculture to investigate and report upon the nutritive value of the various articles and commodities used for human food, with special suggestion of full, wholesome, and edible rations less wasteful and more economical than those in common use, ten thousand dollars; and the agricultural experiment stations are hereby authorized to co-operate with the Secretary of Agriculture in carrying out said investigations in such manner and to such extent as may be warranted by a due regard to the varying conditions and needs of the respective States or Territories, and as may be mutually agreed upon; and the Secretary of Agriculture is hereby authorized to require said stations to report to him the results of any such investigations which they may carry out, whether in co-operation with said Secretary of Agriculture or otherwise.

Even President Cleveland was led to comment on the appropriation. In his second annual message to Congress on December 3, 1894, he said that "when we consider that fully one-half of all the money earned by the wage earners of the civilized world is expended by them for food, the importance and utility of such an investigation is apparent." It will be noted that the actual bill differed somewhat from the recommendation. Although provision was specifically made in both for the investigations to be coöperative, no limit was set on the amount of funds required from the experiment stations in prosecution of the investigations.

Immediately, the new work was assigned to the Office of Experiment Stations, a special agent was appointed to supervise the investigations, and plans were promulgated for future activity. The wording of the appropriation act influenced greatly the procedure and conditions under which investigations were to be carried out. It was the intention that the nutrition studies should be coöperative projects and the history of the first decade of nutrition work in the national government is the history primarily of studies carried on by the experiment stations under the supervision of the Office of Experiment Stations.

This coöperative program which the law specified had certain advantages. It enabled the training of a considerable number of workers. The results of the many investigations were not only disseminated by the publications of the Department of Agriculture but they also were utilized in the places where the studies were made. Funds were largely used to encourage researches in those institutions which were able to carry on this type of experimentation. In this manner it was believed that "in no other way could so large an amount of work have been accomplished with the money appropriated by Congress for this purpose."

Nutrition Work in the Office of Experiment Stations, 1894-1914. The first work under the appropriation authorizing nutrition investigations consisted of publishing a bulletin containing data on previous nutrition studies in Europe and the United States. The immediate plans called for investigations which included the following:

1. Investigations of the cost, composition, and nutritive value of food materials.
2. Studies of dietaries.
3. Studies of the digestibility of certain foods.
4. Studies of the laws of nutrition of humans.
5. Compilation of the results of previous nutrition investigations.
6. Improvement of research methods.
7. Publication of both technical and popular bulletins.

These studies did not get under way until near the end of the year.

Headquarters for the researches were established at Middletown, Connecticut, where the work was coöperatively carried on in the laboratory of Wesleyan University with the Storrs Experiment Station. As the law had indicated, a policy of coöperation was sought not only from the experiments stations but also from colleges, other educational institutions, and private associations. A great amount of effort was expended in building up "centers of inquiry" where nutrition problems could be studied. However, only those groups which were in a position to contribute supplementary resources in the nature of workers, funds, or laboratory facilities were invited to coöperate. At the end of the first year of operation, eleven such institutions and associations were making investigations. For the first few years all of the actual investigational work was prosecuted at Middletown and at these coöperating institutions.

The function of the Washington office at this time consisted of planning and controlling expenditures, editing and perfecting the details of the reports, collecting bibliographical material, abstracting the literature pertaining to nutrition, part of which was published in the Experiment Station Record, and handling the nutrition correspondence. This latter task grew each year as public interest in the work increased. There was also a considerable demand for the publications concerning these food studies.

The Middletown office was charged with the supervision and planning of the investigations in the different sections of the country, together with conducting special reasearches. Among the latter, the experiments with the bomb and respiration calorimeters were of far-reaching importance. With the latter apparatus it was possible to accurately measure the income and outgo of matter and energy in the human body. By 1900 it was perfected to the extent that a man was able to remain in the respiration chamber for a number of hours or days without undesirable effect. A bomb calorimeter was perfected earlier which measured the heat of combustion in connection with studies of the energy values of food and execretory products.

The nutrition work in the Office of Experiment Stations was consistently expanded from year to year, and included investigations of the food supply and consumption in the United States, experiments correlating the nutritive value and pecuniary economy of food materials, the effect of cooking upon food values, studies of the combustion heat of food materials, and metabolism studies. In 1895, the appropriation was increased to $15,000, in 1900 to $17,500, and in 1901 to $20,000.

The number of coöperative investigations also increased, so that by 1904, experiments in many phases of human nutrition were taking place throughout the country. The following summarizes the localities where studies were prosecuted, the coöperating organizations and institutions, and the nature of the experiments conducted:

Alabama.—Tuskegee Normal and Agricultural Institute. Alabama Polytechnic Institute and the Alabama Experiment Station, Auburn. Study of the food consumption of the negroes in the "black belt" of Alabama, and of the character and nutritive value of the food materials used by negroes.

California.—University of California. Cost and nutritive value of California food materials, especially fruits and nuts; dietary studies of infants, athletes, professional men, fruitarians, and Chinese; digestion and nitrogen metabolism experiments with an infant and with fruitarians. Detailed study of the nutritive and economic value of Chinese vegetable food materials found in the markets of San Francisco.

Connecticut.—Wesleyan University and Storrs Experiment Station. Cost and nutritive value of various food materials; dietary studies; digestion and nitrogen metabolism experiments; development of bomb calorimeter and respiration calorimeter, and of methods of using these in investigations of the metabolism of matter and energy in the human body.

Georgia.—University of Georgia. Dietary studies of college boarding clubs, and of families in the mountain regions of Georgia.

Illinois.—Hull House, Chicago; and Lewis Institute, Chicago. Dietary studies.

University of Illinois. Cost and nutritive value of food materials; dietary studies; special investigations on meat, including losses in different modes of cooking, and digestibility of meats cooked in different ways. Studies in cooking meat.

Indiana.—Purdue University. Dietary studies.

Maine.—University of Maine and Maine Experiment Station. Studies of the nutritive value of a number of food materials; feeding experiments to determine the value of milk in the diet; and dietary studies and digestion experiments, especially with lumbermen in the Maine woods. Experiments on the digestibility and nutritive value of bread made from different grades of flour; study of experimental methods, particularly means of separation of feces in digestion experiments and determination of metabolis nitrogen in feces.

Maryland.—Coöperation with the Department in the preparation of summaries of data regarding the nutritive value and place in the diet of sugar and of leguminous vegetables, and in connection with this work made a number of cooking experiments.

Massachusetts.—School of Housekeeping, Boston; carried on dietary studies in a number of which the attempt was made to regulate the cost of the food and at the same time make it compare with commonly accepted dietary standards. The results of these investigations were submitted to the Department for calculation and publication.

Harvard University, Cambridge.—Dietary studies of athletes. Dietary studies of students.

Springfield Bible Normal College.—Dietary study. In this investigation the attempt was made to regulate the cost of the daily food and at the same time make it correspond with the commonly accepted dietary standards. The results were submitted to the Department for calculation and publication.

Minnesota.—University of Minnesota and Minnesota Experiment Station. Study of losses in cooking vegetables and in making bread; special studies of cereal products, including relative nutritive value of milling products of wheat, and digestibility and nutritive value of bread made from different grades of hard and soft wheat flours. A considerable part of the latter investigation was carried on coördinately with similar work at the Maine Experiment Station.

Missouri.—University of Missouri. Dietary studies; investigation of the relative consumption of different kinds of meat and bread.

New Jersey.—New Jersey Experiment Station. Dietary study; studies of the cost and composition of milk and of bread, of the relative cost of bread and the raw ingredients from which it was made, and of the losses in baking bread.

New Mexico.—New Mexico College of Agriculture and Mechanic Arts and New Mexico Experiment Station. Study of the relative nutritive value of native food materials, especially native beef, and of the food consumption of native Mexican families.

New York.—History and methods of teaching cookery in the public schools of New York City.

Cornell University, Ithaca. Measurements of mechanical work, and studies of the efficiency of man as a machine.

New York Association for the Improvement of the Condition of the Poor and New York Christian Alliance, New York. Dietary studies of poor families in congested districts in New York City.

Columbia University, New York. Digestion experiments and investigations on the metabolism of nitrogen, sulphur, and phosphorus in the human body.

North Dakota.—North Dakota Agricultural College. Dietary study.

Ohio.—Lake Erie College. Dietary study.

Pennsylvania.—College Settlement, Philadelphia. Dietary studies of families of limited income were undertaken, the data obtained being submitted to the Department for calculation and publication.

Pennsylvania College for Women, Pittsburgh. Dietary studies; study of the composition and cost of bakers' bread in Pittsburg and of the changes in the materials of bread during baking.

Tennessee.—University of Tennessee. Analyses of Tennessee food materials; dietary studies; experiments on the effect of muscular work upon the digestibility of food and the metabolism of nitrogen; studies of the digestibility and nutritive value of legumes.

Vermont.—Vermont Experiment Station. Dietary studies of farmers' families.

Virginia.—Hampton Normal and Agricultural Institute. Dietary studies of negroes.

State University. Studies of the physiological effects of meat bases, i. e., creatin and creatinin.

This serves to indicate the range of research work carried on under the supervision of the Office of Experiment Stations. Later on several other groups coöperated in similar researches.

The nutrition investigations carried on up to 1906 fall into four classes: (1) Digestion and metabolism experiments, (2) cooking experiments, (3) dietary investigations, and (4) studies of the chemical composition of foods. The results of chemical work, published in 1906, formed the basis for one of the most fundamental contributions of the Department of Agriculture, and is still the nearest approach to a comprehensive standard work of reference.[20] An able summary of the researches completed cities the following:

> . . . the investigations which have shown the relative value of different kinds of wheat flour, the high nutritive value of all such food, and the value of cereal breakfast foods and similar goods as compared with flour; the relative digestibility and nutritive value of corn bread of different sorts as compared with wheat-flour bread and other staple foods, and the losses sustained by many common food materials when prepared for the table and cooked in a variety of ways. Studies of the nutritive value of meat cooked in different ways and the determining of the factors which influence flavor and quality of cooked meat may also be mentioned, as well as the demonstration of the importance of fruit and nuts as sources of nutritive material when intelligently used; the high nutritive value of beans, peas, and other dried legumes, including especially cowpeas; the determination of the amount of iron required in the diet and ways in which it may be economically supplied by the use of food materials rich in this constituent, and the proof that cheese is thoroughly digestible and a food material which may be used in large quantities in the diet as an inexpensive source of both protein and energy. Experimental methods have been elaborated, the bomb calorimeter has been perfected, and the respiration calorimeter has been devised. The latter is an instrument of precision which affords the most satisfactory means yet devised for studying the many complex questions which are connected with the general laws of nutrition, as well as practical questions which have to do with the way the body utilizes its food supply; the relative value of different food materials; the amount of energy expended in different kinds of muscular work, and the relative value of different foods and food combinations for supplying such body needs.

In 1906, it was decided to discontinue the work in Middletown and transfer it to Washington. Dr. Atwater had become incapacitated, and the Carnegie Institution, which had been coöperating in the work, contemplated the establishment of a separate nutrition laboratory in Boston. Congress appropriated in 1907 the sum of five thousand dollars for transporting from Middletown and installing the respiration calorimeter and other apparatus in the new Department building. During the installation it was possible to make many improvements to this important piece of apparatus.

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[20] Office of Experiment Stations, Bulletin 28, 1906.

Congress, in 1907, authorized seven thousand dollars for completion of the apparatus and for "preparing for publication" results already obtained. But no funds were appropriated for nutrition investigations. In 1907, the Secretary of Agriculture had stated in his annual report that:

> The problems concerned with the rational and economical utilization of agricultural products as human food are so intimately and vitally related to those connected with the production of the food stuffs on the farm that the nutrition investigations may well be a part of the work of this Department. The experimental methods which have been elaborated and the lines of work which have been followed in the nutrition investigations are well fitted to supply the information which is needed in order to utilize in a satisfactory way the available food supply in the proper and economical feeding of families and groups. In view of the demonstrated usefulness of this work and the large demand for information along these lines, especially for use in connection with our public and private schools, where the scope of instruction relating directly to home life of our people is being steadily enlarged, I earnestly recommend that provision be made for the continuance of these investigations. A place has been provided in the new Department building for the respiration calorimeter, and it will be possible there to continue the fundamental researches which are required to put our knowledge of the utilization of food in the body on a thoroughly scientific basis.

In 1909 Congress again provided funds for the carrying on of nutrition work by authorizing ten thousand dollars for this work. Dr. Charles F. Langworthy, who had been in charge of the Washington office, was given supervision over the work. He later was made the Chief of the Office of Home Economics in 1915, and functioned as such until the reorganization in 1923, so that for a period of fourteen years the home economics work was carried on under his direction. At this time coöperative investigations with the experiment stations were discontinued, but the appropriation bill specified "coöperation with the other bureaus of the Department." Under the new wording the Secretary of Agriculture was directed to "investigate the nutritive value of agricultural products used for human food, with special suggestions for the more effective utilization of such products for this purpose." Information resulting from such studies was to be disseminated. By 1913 the appropriation had been increased to sixteen thousand dollars.

With the installation of the respiration calorimeter in the Department building, experiments were begun in Washington. Tests of the digestibility of cheese and beef were conducted and bulletins were prepared on these subjects. In collaboration with the Bureau of Animal Industry, a bulletin on milk was published. Studies of the nutritive value of table and culinary fats were also made coöperatively with that Bureau. In collaboration with the Bureau of Chemistry, studies of the ripening of fruit were made in 1913.

The nutrition publications issued comprehended various food problems. By 1910 sixty technical bulletins had been distributed on the composition of food materials and on the studies of experimental methods, digestion, metabolism, cooking processes, and other subjects. About twenty-five popular contributions had been made at this time, of which nearly 1,200,000 of one of these were distributed. One of the noteworthy characteristics of this phase of the nutrition work was the introduction of popular bulletins in the presentation of nutrition material, for it marked the first attempts in this direction. Up to 1915, when the home economics activities were reorganized into the States Relations Service, approximately 132 publications had been issued, of which sixty-two were technical bulletins. Included among the popular topics were "Principles of Nutrition and Nutritive Value of Food," "Meat-composition and Cooking," "Bread and Bread-Making," "Eggs and Their Uses as Food," "Use of Fruit as Food," "Use of Milk as Food," "Food Value of Corn and Corn Products," "Cereal Breakfast Foods," "Canned Fruit, Preserves, and Jellies—Household Methods of Preparation," "Preparation of Vegetables for the Table," "Economical Use of Meat in the Home," "Modern Conveniences for the Farm Home," and "Care of Food in the Home."

Of the 16,305,800 copies of all bulletins issued, 15,952,152 were these popular Farmers' Bulletins.

Formation of the Office of Home Economics in the States Relations Service, 1915. The enactment of the Smith-Lever Extension Act on May 8, 1914 (38 Stat. L., 372), brought about several important changes in the home economics work. This act provided for "co-operative agricultural extension work between the agricultural colleges in the several states and the Department of Agriculture, to aid in diffusing among the people of the United States useful and practical information on subjects relating to agriculture and home economics, and to encourage the application of the same." Among other things it stipulated:

> Sec. 2. That co-operative agricultural extension work shall consist of the giving of instruction and practical demonstrations in agriculture and home economics to persons not attending or resident in said colleges in the several communities, and imparting to such persons information on said subjects through field demonstrations, publications, and otherwise; and this work shall be carried on in such manner as may be mutually agreed upon by the Secretary of Agriculture and the state agricultural college or colleges receiving the benefits of this act.
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> Sec. 3. That for the purpose of paying the expenses of said co-operative agricultural extension work and the necessary printing and distributing of information in connection with the same, there is permanently appropriated, out of any money in the Treasury not otherwise appropriated, the sum of $480,000 for each year, $10,000 of which shall be paid annually, in the manner hereinafter provided, to each state which shall by action of its legislature assent to the provisions of this act.

Home economics was thus "linked with agriculture as an essential part of the broad system of co-operative extension work now carried on by the land-grant colleges and the United States Department of Agriculture in all the States."

Under this law the Office of Experiment Stations, in which nutrition investigations and home economics work had been carried on, was absorbed into a new unit called the States Relations Service, which was organized July 1, 1915, pursuant to an order of the Secretary of Agriculture. This change had been authorized by the 1915-16 appropriation bill. In the new States Relations Service, together with the Office of Experiment Stations, Office of Extension Work in the South, and the Office of Extension Work in the North and West, was placed the Office of Home Economics. It was the object of this reorganization to bring together the administrative and advisory work of the Department of Agriculture in its relations with the state agricultural colleges and experiment stations.

From 1915 on, the investigations, which previously had been confined to nutrition problems, were extended to include studies pertaining to the broad field of domestic economy. Although plans had been formulated in 1914 for the "experimental study of the energy expenditure in the different forms of household labor and the relation of this expenditure to the different kinds of equipment and different methods of working," and a pamphlet had been published on the "Farm Kitchen as a Workshop," the emphasis on the economic aspects came with the organization of the Office of Home Economics in the States Relations Service. It will be remembered that the Smith-Lever Act made provision for "instructional and practical demonstrations in agriculture and home economics to persons not attending the colleges."

Accordingly, Congress in 1914 authorized this broader field of study. The appropriation act provided as follows:

> To enable the Secretary of Agriculture to investigate the relative utility and economy of agricultural products for food, clothing, and other uses in the home, with special suggestions of plans and methods for the more effective utilization of such products for these purposes, with the co-operation of other bureaus of the department, and to disseminate useful information on this subject. . . .

Through this authorization and the succeeding appropriations the functions of the Office of Home Economics gradually expanded during the life of the States Relations Service.[21]

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[21] To 1923.

The work in home economics from 1915 to 1923, comprehended a long series of investigations, researches, and publications. In addition to the nutrition studies, investigations on food, clothing, household equipment, and household labor were prosecuted. Results of the research program and other suitable material were sent to the extension workers "so that they might impart it directly to the people." Another function of the Office of Home Economics was to disseminate information by correspondence. Many persons wrote directly for information on specific household problems. There was also correspondence with extension workers in all the states through the Offices of Extension work. In this respect the Office of Home Economics was a source of ammunition for the educational extension work augmented by that furnished by the state colleges.

Expansion of Activities, 1915-1923. The investigations during this period marked the beginning of increased activity in the home economics work. Studies undertaken between 1915 and 1923 fall into three groups: (1) Food and nutrition, (2) household labor and equipment, and (3) textiles and clothing. Included in the food studies were the experiments in the chemistry and physics of cooking processes carried on in a laboratory kitchen. Dietaries also were investigated and attention was given to the preparation and planning of meals. A large amount of time was devoted to coöperative researches with other agencies, particularly units in the Department of Agriculture. Although the functions of the Office of Home Econimics were broadened considerably, nutrition investigations still remained the most important due to the lack of research methods in other fields of home economics, including clothing and textiles.

A potential element in this increased activity in home economics was the stimulus to food research which came about as a result of the World War. The war called attention "to the value of home economics and the need for further research as no other situation had ever done." The Office of Home Economics found itself one of the leaders in the food conservation program, and a large portion of its time and resources were devoted to conservation compaigns, especially those for the conservation of food in the home. Dr. Atwater's bulletin on food composition was used extensively by not only the United States but also the Inter-Allied Food Commission in determining the food requirements of the allied nations. Weak spots in home economics were brought to light and the Office, by the attention attracted to its work and functions, was enabled to expand. The coöperative aid which it gave to the United States Food Administration, the Council of National Defense, and the Department of the Treasury are discussed in this section at a later point. The concrete result of the war stimulus was the establishment of a laboratory kitchen.

Digestibility of Food Experiments. Experiments concerning the digestibility of various foods and food materials were presecuted, and a large portion of the work each year was devoted to this type of activity. Included among the products analyzed were animal and vegetable fats, grain sorghums, breads made from coarse flours, dasheens, corn, peanut flours, fish, cereal grains, various wheat flours, meats, hydrogenated oils, raw starches, and pie crusts. This list by no means exhausts the number of products studied but indicates the wide variety of food materials investigated. These experiments were reported both popularly and scientifically in numerous bulletins and articles.

The Laboratory Kitchen. In order that data could be developed relative to the chemistry and physics of cooking processes a laboratory kitchen was installed. A demonstration kitchen also was equipped for the purpose of training extension workers. It was especially during the war that emphasis was placed upon the development of cooking methods for the new foods which the nation was being forced to utilize.

In the report of the Chief of the Office of Home Economics for 1919 the nature and results of the work of the experimental kitchen are mentioned as follows:

(1) Studies of yeast breads brought out the detrimental effect of long kneading particularly in the later stages of dough fermentation; several current recipes for yeast starters were tested.

(2) Studies in fuel conservation with gas range determined the losses caused by the common defects of having burners placed too far beneath the cooking utensil, and of having them too large in proportion to the size of the utensil; the claims of a commercial "gas-saver" were not substantiated; gas consumption in using small separate oven over top burner for baking was compared with that of the range oven.

(3) Household methods of making jellies, and of increasing yield from fruits deficient in pectin and in acid by addition of commercial and homemade pectins or of lemon juice or by use of pressure cooker, were studied and favorably reported upon. A study of yield showed that a pound of good jelly-making fruit should yield a pound or more of jelly.

(4) Studies in pastry making emphasized the fact that to be of good quality an economical paste must have water reduced as well as fat, and that vegetable oil can be used for pastry if care is taken not to use too much fat.

(5) Cake making with various oils and other fats demonstrated that baking at temperatures high enough to produce "humpy cake" (a common fault) causes an increase of gas consumption of about 50 per cent, which is worse than wasted.

(6) A study was made of methods of canning vegetables, especially spinach, and of the rate of heat penetration in processing.

(7) Investigation of various methods of cooking dried fruits and vegetables revealed the fact that in almost all cases preliminary soaking is unnecessary and sometimes distinctly disadvantageous. Observations were also made upon the varying degrees of rapidity with which successfully-dried vegetables gradually lose their color and flavor upon aging, no spoilage having taken place.

(8) Outlines designed to facilitate standardization of methods in experimental cookery were prepared and distributed for use in colleges offering courses in that subject.

(9) Studies in absorption of fat by batters and doughs fried under varying conditions were carried on with a view to controlling this important source of waste.

In 1920, the work was expanded and other cooking experiments were conducted pertaining to home canning and packing of vegetables, pastry making, and studies of granulated and smooth fats. Somewhat later there were worked out household methods of preparing pectin extracts from apples and the peel of oranges and lemons. Meats and vegetables were also experimented with in the laboratory kitchen.

The laboratory kitchen experiments enabled the Office of Home Economics to give practical suggestions for the preparation, selection, and preservation of food products. In connection with practical dietetics it published many bulletins on meal planning. Charts which described the value, quantity, and kinds of food needed in the average family diet were prepared. Two of these were entitled "A Week's Food for an Average Family" (chart), and "Good Proportions in the Diet" (bulletin). Similar articles dealt with the preparation of particular foods such as corn, rice, and milk.

Problems of Household Management. The aim of studies of household labor was "to reduce the amount of physical labor required in housekeeping." To this end, labor-saving devices which would lessen the amount of labor required to do the tasks of the household were experimented upon and improvements were made.

In order to determine the relative demands of different types of labor the respiration calorimeter was used. It was possible with this apparatus to measure the amounts of energy expended in carrying on such household tasks as sewing, cleaning, scrubbing, and ironing. One experiment of this type related to the energy requirements of sewing, and the object and results were as follows:

> The object was to determine the increase, if any, in energy expenditure in sewing on heavy-weight goods as compared with light-weight; the energy expenditure in sewing at different speeds; and the energy expenditure of a woman sewing by hand, with a foot-driven sewing machine, and with a motor-driven machine. In sewing with the power-driven machine and by hand the subject expended about the same amount of energy per hour, but sixteen times more work was accomplished with the motor-driven machine. The energy expended per hour for the work done

with the foot-driven machine was about six times as great as in the case of hand sewing, but the output was fourteen times greater.

A circular which discussed the "essentials of a well-planned kitchen" was distributed. In the last year of operation under the States Relations Service the Office of Home Economics conducted respiration calorimeter studies of sweeping and ironing particularly. In ironing it was revealed that the "height of the working surface influences the expenditure of energy in household tasks, being less when the equipment is adjusted to a comfortable height."

The type of equipment with which the homemaker does her work exerts a strong influence on the relative efficiency of that work. In the beginning general questions of household equipment were considered. Later, specific problems were studied and recommendations were made pertaining to household equipment. The preparation and finish of wood, the relative value of floor oils, and other topics were studied.

Toward the end of the period the Office of Home Economics realized "the importance of economic data in the consideration of home-economics problems." Previous to 1920, the work in this direction had been limited. A household labor survey had been undertaken in ninety-one farm homes in St. Joseph County, Michigan. Its purpose was to get information on household management and labor. The results of this report showed that:

> Only one-fifth of the farm women represented in this survey hired help at any time, two-thirds depended upon the help given by members of the family, and one-tenth stated that they had no help. The average length of a farm woman's day in this locality was 13 hours in summer and 10 in winter, including time spent at meals. They estimated that they had one and one-half hours of leisure daily in summer and two and one-half in winter. More than one-fourth of the women took no pleasure trips by automobile or train during the year, the others took trips averaging 55 miles. On only 3 farms did the men have the entire care of the poultry, while 69 per cent of the women cared for it all of the year. In 2 of the 3 areas surveyed 73 per cent of the women helped all or a part of the day with farm work

during the busy season. Twenty-four out of 27 reporting depended upon the "butter, poultry, and egg money" to furnish the food purchased, household supplies, and part of the family clothing. Only 6 out of the 69 reporting had a bank account, separate from the husband's, for household expenses.

A paper entitled "A Survey of Farm Homes" was also published in 1921, which discussed questions of labor, health, and other factors in the farm home.

However, a more comprehensive study in coöperation with the Bureau of Agricultural Economics and the New York State College of Agriculture was a survey of four hundred farm homes in Livingston County, New York. Its purpose was to secure data on the standard of living of the farm home. Among the factors covered were such details as income, expenditures for various purposes, sanitation, furnishings, time consumed in labor, the amount of leisure, social life, and other socio-economic matters. This study was still in process in 1923, when the Bureau of Home Economics came into existence.

Textile and Clothing Work. Early work on textiles and clothing dealt chiefly with the problem of prolonging wear and lengthening the period of usefulness. Data on the removal of spots and stains was published as a bulletin within the first year. A bulletin on "Floors and Floor Coverings," which explained how to mend carpets and rugs, was commented upon favorably by manufacturers and dealers in the carpet and rug business. Other publications on laundry work, care and cleaning of the home, and selection and care of clothing were distributed. The object of these was to show "how a saving of labor can be effected and how a saving of money can be made possible by prolonging the period in which a garment or article" can be kept in good condition. A bulletin on sewing also was prepared and published.

In comparison with other activities, however, the Office of Home Economics gave relatively little time to this particular branch of home economics.

Coöperative Studies of Home Economics Problems. Many of the researches were conducted coöperatively with other agencies. While most of these were with units in the Department of Agriculture, frequently outside bureaus and even private associations worked hand in hand with the Office of Home Economics upon mutual problems. The original appropriation act specifically authorized coöperative endeavor, and the wording of the annual act was unchanged during the existence of the States Relations Service.

Respiration calorimeter studies of the incubation of hen's eggs were carried on with the Bureau of Animal Industry. That bureau also requested studies of the digestibility of young veal and of hard palates of cattle which were undertaken, reported, and published. A number of commercial fats made for cooking purposes were studied in coöperation with the Bureau of Animal Industry. Tests of the "relative economy, flavor, and culinary quality of different grades and classes of meat cooked by standardized methods" were also made for that bureau.

Respiration calorimeter investigations of wintering bees with reference to economy in feeding were coöperatively prosecuted with the Bureau of Entomology.

Both the Bureau of Standards and the Office of Home Economics studied the effects of age on various kinds of rubber rings for glass jars. In 1922 the Bureau of Standards coöperated in studies to determine the degree of efficiency attainable in different baking and cooking tasks. The Bureau of Standards worked for several years in a coöperative way upon investigations on the tarnishing and detarnishing of silver.

Problems concerning canning, drying, and salt-pickling and the use of these products in the home formed the object of coöperative experimentation with the Bureau of Chemistry.

The Bureau of Plant Industry and the Office of Home Economics tested some of the less widely used kinds and varieties of vegetables, particularly the green-leaf vegetables, with a view to supplying data which would be useful in preparing gardening and canning budgets for the rural household. At the request of the Bureau of Plant Industry, studies were undertaken on the possibility of sprouting and cooking mung beans.

Experiments upon the digestibility of fish were prosecuted with the Bureau of Fisheries.

The War Department in its attempt to find an emergency ration which would have the qualities of digestibility, keeping quality, and other requirements requested the aid of the Office of Home Economics. Exhaustive research resulted in developing a suitable emergency ration. Similar work was done for the Navy Department and the Coast Guard.

During the period of the World War continued assistance was given to the United States Food Administration, Council of National Defense, and other organizations. The special series of food leaflets, which were brief and concise in form, gave reasons why certain foods should be used, rational and practical ways, including recipes for preparing them for the table, and suggestions for their combination into palatable meals. A million copies of each of the following leaflets were distributed:

1. Start the Day Right with a Good Breakfast
2. Do You Know Corn Meal?
3. A Whole Dinner in One Dish
4. Choose Your Food Wisely
5. Make a Little Meat Go a Long Way
6. Do You Know Oatmeal?
7. Food for Your Children
8. Instead of Meat
9. Vegetables for Winter
10. Plenty of Potatoes
11. Save Sugar
12. Dried Peas and Beans
13. Let the Fireless Cooker Help You Cook
14. Save Fuel
15. Milk—the Best Food We Have
16. Fresh Vegetables—Good to Eat and Good for Your Health
17. Use More Fish
18. Rice
19. Hominy
20. Wheatless Breads and Cakes.

In coöperation with the Food Administration and the Council of National Defense, a pamphlet was prepared entitled "The Day's Food in War and Peace," which included nine lessons on food topics. The object of this wartime endeavor was to show the housekeeper how foods and food combinations could be used in a satisfactory and adequate diet and yet effect a saving of various commodities needed for war purposes. In 1918 the Office of Home Economics coöperated with the Savings Division of the Department of the Treasury in the preparation of a series of "Thrift Leaflets" designed to aid the Department in its educational campaign for wise spending.

A dietary study made in coöperation with the Bureau of Markets was undertaken as a war measure. It grew out of the survey of food stocks on hand conducted by the Department of Agriculture and was intended to aid in shaping up the nation's program for food production and consumption. Two thousand dietary records, each of which covered a seven-day period, and collected from nearly fifteen hundred families and five hundred and seventy-five institutions were included in this survey. Persons representing forty-six states, sixteen nationalities, many different occupations and income levels, both rural and urban, were studied.[22]

Other units interested in subjects akin to home economics, frequently worked with the Office on various problems. It follows that a great portion of the home economics work was of a coöperative nature up to 1923.

The Director of the States Relations Service, in his report for the year 1923, summarized the home economics work during this period as follows:

> In 1915, when the States Relations Service was organized, the nutrition investigations were expanded to form the Office of Home Economics as a part of that service. Doctor Langworthy was appointed chief, and a larger staff, increased appropriations, and additional laboratory and office space have followed, which have made possible a broader program and a greater output. The work, as defined in appropriations acts, has covered investigations of the relative utility and economy of agricultural products when

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[22] Published in the Yearbook of the Department of Agriculture, 1920

used for food, clothing, or other purposes in the home. Some studies on household equipment and management have also been made. Experimental studies of practical and technical problems have been made by appropriate laboratory methods, some of them especially adapted or devised for particular work. There have also been the collection and interpretation of statistical data regarding food consumption of individuals and families and studies of household labor and of household management. The respiration calorimeter as an instrument of precision has been shown to be well adapted to the study of a wide range of agricultural problems, in addition to those specially concerned with the home.

The dietary-survey methods with individuals and families have been developed into a nation-wide dietary survey, a result of war-time need for definite information of this character. The machinery for carrying on such surveys has been perfected and includes cooperative features within the department and with agricultural colleges which increase its usefulness out of proportion to the cost involved. Such surveys furnish per capita consumption data hitherto lacking and other information essential to agricultural production intelligently adjusted to the people's needs. Such surveys can and should be extended to include clothing, equipment, etc., as well as food, in order that production and consumption in general may be considered on the basis of information much needed but now lacking and other important economic problems furthered.

The development and extension of earlier work on food preparation and use have resulted in an "experimental kitchen," well provided with physical and chemical apparatus, as well as household equipment, where a great variety of problems have been studied. A feature of this work has been the development of coöperation with home-economics workers in agricultural and other colleges.

A plan has been devised for determining proper food selection in such a way that any housekeeper may feel sure that the food she provides her family will meet their needs. This generalization can be so simply expressed that anyone can understand and apply it. On the other hand, it is so fundamental in its nature that it proves equally useful for advanced teaching and for technical discussions.

More than a beginning has been made in work on clothing and household equipment, with the result that several bulletins have been published, and material accumulated for others includes results of tests as well as some generalizations.

Creation of the Bureau of Home Economics. The organization of the home economics work into a Bureau of Home Economics came as a result of recognition by the Secretary of Agriculture of the necessity for more intensive study of home problems. In August, 1922, Henry C. Wallace, then Secretary of Agriculture, authorized the Assistant Secretary of Agriculture to state at the annual convention of the Home Economics Association as follows:

> . . . we have in mind to greatly strengthen the scientific work of the Department as it may be related to Home Economics. Ultimately I have in view making the home economics work an independent Bureau, ranking with the other bureaus of the department, and placing at the head of it a woman of executive ability, thorough scientific training, and broad and sympathetic understanding of what is needed to make such a bureau helpful to the women of the land. I am quite sure that out of such a bureau will come an increasing fund of helpful information which can be taken to the homes through our extension activities.

The next intimation of the proposal to establish a separate Bureau of Home Economics came at the annual convention of the Association of Land-Grant Colleges in November, 1922, when the Director of the Scientific Work of the Department of Agriculture discussed plans for the new bureau.

This proposed reorganization coincided with the general plans of the Department, which were to organize the work on three separate lines consisting of regulatory functions, research activities, and extension work. As the States Relations Service comprised not only extension work but also research and regulatory activities, it was necessary to effect a division of work. One of the results was the allocation of home economics research to a separate Bureau of Home Economics.

Thus, on July 1, 1923, the Bureau of Home Economics was created "as a part of the general scheme of reorganization of the Department of Agriculture." This was authorized in the appropriation bill for that year, which provided as follows:

> To enable the Secretary of Agriculture to investigate the relative utility and economy of agricultural products for food, clothing, and other uses in the home, with special suggestions of plans and methods for the more effective utilization of such products for these purposes, and to disseminate useful information on this subject. . . .

A total of $71,760 was authorized for the expenses of the Bureau. Congress did not pass any organic law with respect to the Bureau.

Another factor in the elevation of home economics activities to bureau status was the fact that in 1923, as at present, the "Department of Agriculture had a definite responsibility in developing home economics work through its relation to the land-grant colleges, in which home economics is one of the major divisions." Also, it "has a more direct responsibility in furnishing scientific information on this subject to be carried out by the extension agents under the Smith-Lever Act."

In June, 1923, the Secretary of Agriculture called a meeting of leaders in the home economics field for the purpose of discussing and outlining the activities which the Bureau should undertake. This group recommended the following divisions: Food and nutrition, clothing and textiles, economics (including household management), housing and equipment, home relations, and art in the home. Later, in December, 1923, the presidents of several women's organizations met at the request of the Secretary of Agriculture. This second meeting was called in an attempt to adapt the work program of the Bureau to the actual "needs of women in the home." They recommended the placing of emphasis upon other features related particularly to the less tangible side of home economics research, such as giving the homemaker motives for doing certain household tasks in addition to explaining how to do them.

The two lines of activity immediately organized under the direction of Dr. Louise Stanley who had been appointed Chief of the Bureau and who had been Professor and Chairman of the Home Economics Department of the University of Missouri, were in foods and nutrition and in economics. On July 1, 1924, a Division of Textiles and Clothing was created, but no other units have been established in the Bureau up to the present time. The experimental work in the respiration calorimeter which had been carried on was discontinued, and the apparatus, together with the personnel of the laboratory, were transferred to the Bureau of Animal Industry. As the respiration calorimeter laboratory consumed the greatest share of the annual appropriation, the transfer enabled the Bureau of Home Economics to engage in research projects which would have otherwise been impossible on account of the limited funds available.

CHAPTER II

ACTIVITIES

The primary function of the Bureau of Home Economics is scientific research in home economics. Research projects are conducted under the three divisions of the Bureau: Foods and Nutrition, Clothing and Textiles, and Economics. In addition, investigations concerning home economics problems but not falling directly under any of these three divisions are prosecuted when such studies are deemed essential. The fundamental aim is to establish sound standards for food, clothing, and housing which can be utilized in a practical way by homemakers.

Data obtained as a result of investigations and experiments are compiled, edited, published, and disseminated through scientific and popular bulletins and articles, the radio, and through other methods. In this manner the Bureau seeks to help the homemaker solve the varied problems of the household.

Food and Nutrition Investigations. The function of food and nutrition investigations is to develop sound food standards. It has been said that "food is one of the first considerations in any standard of living" because of its close relationship to "health and physical well-being." This activity of the Bureau involves laboratory research along the lines of (1) Composition of food materials, (2) vitamin studies, (3) dietary studies, and (4) food utilization, including cooking and refrigeration experiments, all of which are concerned with the development of necessary information for establishing food standards in practice.

Composition of Foods. In order to measure food materials in terms of dietary needs the composition of these products must be known. One of the major activities of the Bureau since its formation in 1923 has been to summarize existing data on food composition so that the pioneer work of Dr. Atwater in this field would be brought up to date. Dr. Atwater's work was last revised in 1906, and as so many new foods have since found their way into the average diet new figures have been collected. No chemical analyses of the protein, mineral, water, and energy content of foods are made in the laboratory however, the Bureau's function being to collect and check analyses made by other agencies, including state experiment stations, university laboratories, governmental agencies, and commercial organizations.

In the compilation of data on food compositions much material is obtained from investigations in various branches of agriculture, such as animal industry, agronomy, and horticulture. This is carefully selected for study and comparison with similar results from other laboratories. Classification of the foods according to "botanical species or variety, stage of maturity or geographical distribution, for example, in the case of the fresh fruits and vegetables, or according to degree of fatness and method of cutting in the case of meats," is usually necessary. After figures have been obtained they are analyzed statistically, which often makes it necessary for close contact with the producers of particular foods in handling the data pertaining to that food.

Figures have been compiled for the proximate composition of beef and on fresh fruits.[1] For the purpose of preparing tables to be used in dietary studies several other classes of foods are being studied.

Vitamin Studies. The Bureau summarizes existing and available knowledge of the vitamin content of foods and prosecutes vitamin studies designed to fill the gaps in this field. From these researches scientific facts concerning the relation of vitamins to health are obtained, the importance of which is emphasized when it is known that "an inadequate supply of a single vitamin," as in the disease pellagra, can cause the loss of "many hundreds of people and incur an economic loss of millions of dollars" each year. In this connection certain dietary studies are made in districts where deficiency diseases such as pellagra are prevalent.

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[1] U. S. Department of Agriculture, Department Circulars 389 and 50.

New methods for assay work in determining and testing the vitamin content of foods have been developed. Yeast, lettuce, cod-liver oil, honey, spinach, rice, watermelon, and other food materials have been analyzed for their vitamin content. As foods are cooked, canned, dried, frozen, and processed in various ways, in any one of which the vitamin content may be affected, the Bureau investigates the influence of these various methods of handling and preparation upon the vitamin content.

Methods of analysis differ from those regarding the composition of food products, as none of the "vitamins have been chemically isolated and identified." Vitamin content is determined biologically by the effect of certain foods upon the growth of young animals. For research purposes rats are used. Special techniques are required concerning the breeding and rearing of the animals, housing, temperatures, care, feeding, and weighing. As from "forty to fifty animals are required to determine the value of a food as the sources of any one vitamin" for a complete analysis of a food, many experimental animals are required.

When the results are obtained effort is made to present the facts through articles, charts, pamphlets, and other methods to both the producers and the consumers. A considerable amount of illustrative material is prepared which emphasizes the facts graphically and shows the effects of malnutrition upon animals. The Bureau also furnishes rats for experimental purposes to teachers, extension workers, and nutrition investigators.

Dietary Studies. Knowledge of food habits is not only essential for education with respect to correct nutrition but also for "any plan for food distribution." Using the data obtained from farm standard of living surveys the Bureau has been able to determine the "quantity and money value of foodstuffs" consumed by the families studied and convert this into terms of nutritional standards. It seeks to standardize methods in dietary research, to ascertain the correlation existing between health and diet, and to suggest diets usually recognized as being essential for good nutrition.

Food Utilization Studies. In conducting studies of the utilization of food products the laboratories for experimental cooking, baking, and canning are used. Problems in food preparation and preservation constitute one of the important and vital problems in the home. The function of research in this field is to "test the cooking quality and palatability of food produced under varying conditions, to determine the more satisfactory uses for well-known foods, and to find uses for new foods brought to the Bureau's attention by producing groups." It will thus be noted that food utilization experiments not only involve studies of the quality of food in relation to use but they also are directly aligned with the production factors which influence the qualities of food materials placed on the market. In the long run the aim of the Bureau is to set up specifications for foods which may be used by the housewife in determining the product or products best adapted to any particular use.

One of the major projects in this phase of the Bureau of Home Economics' work, and one that is typical and illustrative, has been a detailed food-utilization experiment in meat cookery which has run for four years. The investigation has proceeded along two lines: "first, the fundamental work of developing laboratory methods of cooking meat for palatability tests, and second, the developing of household methods based on laboratory technique." The first is a coöperative project with the Bureau of Animal Industry, the Bureau of Agricultural Economics, and twenty state agricultural experiment stations. With animals "produced by experiment stations under controlled and varied breeding and feeding conditions," standard methods have been developed for "roasting beef ribs, leg of lamb, veal and pork cuts." In these experiments on the palatability of meat approximately 2,400 cuts of meat have been roasted consisting of 1,600 legs of lamb, 600 rib roasts of beef, and 200 cuts of pork. Such problems as searing, oven temperatures, and the use of electric ovens are considered.

In connection with the second line of activity of the meat investigations "household methods of cooking meat have been developed in order to tell the homemaker how to cook meat according to the cut, how to cook it to bring out the maximum flavor, and how to cook it without guesswork." A roast meat thermometer has been developed for household use which is inserted in a piece of meat throughout the cooking process and shows when the meat is done. This thermometer makes meat cooking a more scientific process. After investigations of certain meats are conducted popular bulletins, such as "Cooking Beef According to the Cut," "Lamb as You Like It," and "Pork in Preferred Ways," are prepared for distribution.

A similar project is now under way on potatoes in which potatoes of the same variety grown under different cultural conditions are being studied. One of the by-products of the potato experiments has been observation of the influence of storage temperatures on potatoes and it was found that potatoes stored at low temperatures do not make good potato chips.

Experiments have been made on the cooking of poultry, eggs, vegetables, and cereals, and these food materials have been prepared experimentally. Recipes are tested and new recipes are developed. The function of research in cooking is to "set up a high standard of food preparation for the family and the institution in order to reduce the waste of materials, time and effort, and to eliminate as far as possible the loss of nutritive value of food in its preparation."

In view of the limitation of production of hard wheat flours the Bureau has made a number of researches of soft wheat flours in order that this type of flour can be utilized. It was found that with some variations in proportions and methods in handling, soft wheat flours can be used satisfactorily.

Softer flours yield more successful results when the proportions of sugar and yeast are slightly increased; also that the softer flours gave best results when the mixing was not too severe.

One of the food problems with which the Bureau is concerned is canning. Attention has been given to a study of the "times and temperatures required for processing fruits and vegetables in glass containers, and the influence of the hot pack on the time required." Experiments under comparable home conditions have been made on canned meats, chicken, asparagus, beans, peas, blackberries, beets, and strawberries. An investigation to determine the causes for color changes in canned fruits came as a result of general complaints of these color changes. The preserved foods are opened after storage and scored, and from the results obtained satisfactory methods for the preservation of perishable foods are determined.

The Bureau prosecutes investigations upon special projects with other bureaus in the Department of Agriculture. In order to stimulate the eating of rabbit meat the Bureau, at the request of the Bureau of Biological Survey, made a study of the uses of rabbit meat. Methods for preparing reindeer meats were also developed in coöperation with the Bureau of Biological Survey. The Bureau of Plant Industry and the Bureau of Home Economics are coöperating on a study of potato cookery, in which different varieties of potatoes that have been grown under various soil conditions are tested in cooking.

When special food problems arise they are usually set up as individual projects and given special attention.

Refrigeration Studies. The importance of proper care and refrigeration of food, which has been given emphasis in recent years by the development of electrical refrigeration, is pretty generally realized. The Bureau of Home Economics' activities comprise analyses and tests concerning the various factors entering into adequate care of foods and food products.

Spoilage of foods is studied in a bacteriological laboratory. Such products as beef and milk are investigated by making culture studies, miscroscopical examinations, and hydrogen-ion determinations. From the culture studies it is possible to determine the "different kinds of bacteria growing most favorably at various temperature levels and their effect on decomposition." Microscopical examinations of various decomposition changes show what changes occur in the cellular structure and in the bacterial population. By showing acidity change accompanying the advancement of spoilage, the hydrogen-ion determinations are significant. With respect to meat the function of these analyses is to define more clearly the term spoilage; "what takes place in the spoilage process; does spoilage penetrate down into the meat, and if so, is the spoilage due to the penetration of bacteria or the diffusion of a toxin?"

In setting up standards of home refrigeration it became necessary to determine in the first place what temperatures were needed for proper home refrigeration. With the coöperation of refrigerator manufacturers, who supply the various units comparisons of the service rendered by electrical boxes, ice boxes of different grades, and two boxes of the same grade, one using ice and one using electricity, are made as regards "cost of operation, temperatures maintained, relative humidity, and the keeping of food." By means of the potentiometer, galvanometer, and other apparatus used in thermocouple readings, the temperatures of refrigerators can be noted without opening the doors of the units.

Charts, technical papers, and bulletins are prepared and distributed which contain information resulting from these investigations.

Textile and Clothing Research. The second main activity of the Bureau of Home Economics is research in the field of clothing and textiles for the purpose of developing sound standards in clothing and for promoting effective utilization of the textile fibers produced in this country. Next to food standards, the selection of clothing and its care constitute one of the chief tasks of the homemaker.

Investigation in this field involves a number of separate lines of inquiry, all falling generally under the head of textile utilization and maintenance. Among these are studies of the problems of home laundering, fabric selection research, investigations of the physiological effects of different types of clothing, and experimental work on designs for clothing and household articles. The Bureau seeks to coördinate the production and marketing phases of cotton and wool with the actual utilization of these fibers by the consumer.

The work has necessarily been of a pioneer character, as comparatively little information is available concerning the relative value of different fibers and fabrics for specific purposes from the standpoint either of economy or suitability to purpose. This is also true with respect to the hygienic value of clothing materials.

The research is conducted in the Bureau laboratories by chemists, physicists, textile technologists, and clothing designers working in the Division of Textiles and Clothing. Bulletins, articles, and leaflets are prepared summarizing the results of these researches which are published and distributed.

Textile Utilization and Maintenance Work. Experimental activities prosecuted in the field of textile utilization and maintenance can be divided into three classes: studies of home laundering, investigations of the physiological effect of different types of clothing, and studies in cotton and wool utilization. The Bureau attacks both the chemical and physical phases of these projects.

Problems in Home Laundering. The study of home laundering, which is a part of the textile maintenance work, is being conducted with a view toward publication of a manual on recommended home laundry methods. This manual is to be based upon the results of actual experimental data obtained from laboratory researches. As its first step the Bureau undertook revision of a bulletin which had previously been prepared on this subject.

A number of separate aspects of the whole problem of home laundering are being considered. Perhaps the most important is the work on the action of various temperatures and washing agents upon the efficiency of the laundry process and upon fabrics of different construction and composition. An experimental washer is used in the prosecution of this research. The first step was the development of a photometric method to determine the amount of soil removed by the various laundry processes. In order that laboratory experiments might closely approximate home conditions it was necessary in the beginning to develop an artificial method of soiling. A suitable soiling mixture containing oildag, olive oil, tallow, and mineral oil and a satisfactory plan for applying the mixture to the fabric were devised.

The second aspect of the research on laundry problems concerns the general subject of sizing, the object being to discover the laundry finish which will most nearly restore the original appearance to cotton materials. The Bureau is seeking to determine the best materials and combinations of materials for sizing purposes and also to measure stiffness, pliability, and adhesiveness for the purpose of defining scientifically these commonly used trade terms. For the measurement of stiffness of fabrics starched with various sizing mixtures an apparatus was perfected, and experiments are being conducted on the measurement of pliability. Both the common and uncommon starches have been used in the hope of effecting utilization of starch products not otherwise utilized. Work on dasheen starch, with the coöperation of the Bureau of Plant Industry, and on canna starch, with the Hawaii Experiment Station, has been done.

To obtain data concerning the influence of ironing on cotton fabrics of different construction and containing cotton of various grades, a project was initiated in 1928. The Bureau seeks to gather from this investigation, in which an experimental household ironer is utilized, the effect of different temperatures and pressures employed in ironing upon cotton fabrics, and also to determine the best temperatures and pressures for different materials. In this study consideration of the chemical changes which occur when cotton is heated under pressure is involved.

Stain removal studies are also carried on for the purpose of ascertaining the reaction of various stains and fibers to the chemicals usually employed.

A number of bulletins on the various problems outlined above have been prepared for distribution preparatory to the publication of the manual on home laundry practices mentioned previously.

Hygienic Aspects of Clothing. The function of research in the field of clothing hygiene is to obtain data regarding the relative value of different fibers and different fabric constructions from a hygienic point of view. In a preliminary survey the Bureau compiled a bibliography of 1180 references to scientific literature, both foreign and domestic, on this subject.

Cotton and wool materials for both outergarments and undergarments are being investigated from the standpoint of their heat, conductivity, air permeability, moisture absorption, and their effect on the skin temperature of the persons wearing them. One of the projects undertaken is a survey of the weight and type of clothing being worn by children under two years of age in various parts of the country.

This particular phase of the research program has been the one most recently developed, and consequently not as much time is devoted to investigations of this type as is given to either textile utilization or textile maintenance problems.

Cotton and Wool Utilization Studies. Research in cotton and wool utilization has for its purpose the economical and satisfactory selection and utilization of textile goods, especially those of importance in the agricultural program of the United States. The Bureau coöperates with national organizations that are attempting to set up quality specifications on such materials as sheeting, blankets, and silk goods in order to give the consumer information upon which to base an intelligent selection.

The activities of the Bureau in this field comprise several projects. As a result of the cotton depression during the past few years major attention has been given to cotton utilization, although studies of wool are also being made.

The object of these particular studies is to determine the effect of construction of fabric, together with the grade and character of cotton on the wearing quality. As a preliminary step the Bureau studied the type and kind of wear of five hundred sheets of known sources which had been discarded. Cotton sheets of known grade and character are studied to ascertain their durability with the coöperation of the Bureau of Agricultural Economics. This investigation is carried on with the aid of a Washington hotel where the sheets are used and laundered. From the study it will be possible to indicate improvements that might be made in the construction of sheets in order to increase their wearing qualities. A similar project is a study of the wearing quality of wool blankets, being made with the Bureau of Animal Industry.

Experimental Clothing Design Work. The function of research in clothing design is to develop experimentally new designs for clothing and household textiles that will suggest better and more extended uses for the fibers of importance. These investigations consist of the development of new designs in the first place, and secondly, critical observation of them in actual use in order to determine their practicability. While this activity of the Bureau is mentioned separately, it ties into the general clothing and textile program of the Bureau, which is research in textile utilization and maintenance. The experimental work is divided into what might be called two separate projects: designs for clothing, and designs for household articles.

Designs for Clothing. The utilization of cotton and wool in children's clothing is given particular attention. Children's clothing is designed which will be durable, easily constructed, easily laundered, and of real assistance in the training of the child. Special emphasis is laid upon the desirability of hygienic clothing. Various garments for small children have been worked out which are in accord with present theories of child training.

After the actual design is made, the clothing is tried out to determine its practicability, with the coöperation of orphanages, institutions, and nursery schools. A considerable portion of coöperative work is done with the Washington Child Research Center. Such things as self-help bibs, hot-weather dresses for girls, cold and rainy weather suits, rompers, sun suits, and other pieces have been designed which are easy to manipulate and also easy to clean. The main object of this type of research in the end is to set up designs utilizing American grown products which will be adopted by interested garment and pattern manufacturers.

Designs for Household Articles. Designing of household articles is the second activity under the general designing work. The Bureau develops suitable designs which will enable the homemaker to make useful articles for the household. One of the chief projects, upon which a bulletin was prepared, was a study of window curtaining, which discussed all curtaining problems. It was, in short, a handbook for the homemaker in the selection and sewing of both artistic and practicable curtains for the home.

All of the designing is conducted with a view toward being especially suitable for the use of American made fabrics.

Sewing Survey and Garment Fitting Study. These two individual projects do not fall directly under the activities which have been outlined because of the fact that both are completed investigations. It seems well to include in this chapter a brief statement of the sewing survey and garment fitting study as illustrative of the type of problems handled by the Bureau. Before embarking on a definite program in 1923 the Bureau decided to make a survey of the home sewing practices of women throughout the country to determine the "actual amount of home sewing done." The survey revealed data which were of particular interest to the Bureau and upon which a partial future work program could be built. From the results of 1981 questionnaires received from thirty-two states, it was shown that nearly three-fourths of the women who reported were making nine or more kinds of garments for men, women, and children. Most of the women who did home sewing lived in small communities. A publication entitled "Present Trends in Home Sewing" was prepared from the data collected in this survey.

It was found that the most outstanding difficulty in home sewing was fitting. The Bureau proceeded to work on this problem and prepared material which gave directions for fitting dresses and blouses to shoulders, necks, bust, hips, and other parts of the body, with remedies for common fitting difficulties.

Projects of this type are conducted with the general aim of attempting to solve many of the common problems which face the homemaker.

Economic Studies. The third research field investigated by the Bureau of Home Economics is that of the economic problems of the home. These studies are concerned with the wise utilization of the family income, and of the time and energy of the homemaker and other members of the family sharing in the work of the home. Generally speaking, the lines of inquiry involved in such investigations fall under the two main heads of consumption economics and household production, with particular emphasis upon those aspects which concern the problems of the consumers themselves, as distinguished from studies of the effect of consumer demand upon production and distribution of particular commodities.

Because of the importance of food in the consumer's budget and in the economic life of the nation, a large share of the Bureau's investigations in this line deal with the consumption and cost of food. Special attention is also given to the economic aspects of clothing consumption. In these phases of the work close coöperation is maintained with the Divisions of Food and Nutrition and of Textiles and Clothing.

Most of the studies in the economics field call for the collection of information from homemakers and other types of persons by correspondence and by use of field workers. In this work the Bureau coöperates with the extension, research, and teaching staffs of many state agricultural colleges and of other organizations which makes it possible to reach a larger number of homes. The planning of the studies, the supervision of the field work, and the analysis and presentation of results are carried on in the Bureau by economists and statisticians. Popular and technical bulletins, articles and leaflets are prepared and distributed summarizing the results of the studies.

Standards and Cost of Living Studies. Included in the studies of standards and cost of living are investigations of present consumption habits, changes in consumption and purchasing habits, and management of the family income.

The function of studies of present consumption habits is to determine the standards of living maintained by families of different types living at different income levels, in order to provide information required for improving these standards and for adjusting the production program of the United States to meet the demands of consumers. Since little information existed as to the standards of living of farm families, the first study undertaken by the Bureau was made with this group in coöperation with the Bureau of Agricultural Economics. Schedules were obtained from over 3000 farm families, showing the quantities and cost of the various kinds of goods and services consumed by each family during one year. A general summary of this study was prepared by the Bureau of Agricultural Economics, while the Bureau of Home Economics made the detailed analysis of the food and clothing expenditures and of the factors affecting them. Several preliminary reports of this study have been published and bulletins are being prepared covering these two items in the family living.

The second study made by the Bureau in this field covered 190 business and professional families living in cities. The data concerning the consumption habits of these families were obtained in part by means of schedules filled in by field agents as in the study of farm families, and in part by means of household accounts kept by the homemakers during the year. In order to make sure of the completeness and accuracy of these accounts, weekly reports were secured from each homemaker and carefully checked.

Since the accuracy of the schedule method of obtaining data on family expenditures is open to question, the Bureau has made a study comparing the figures obtained by this method with the figures from yearly accounts kept by the same families. Both farm and city families were included in this study, forty-four farm families and twenty-four business and professional families sending in weekly records of expenditures. At the end of the year a field agent visited each family and obtained schedule estimates for the same period. Since the keeping of the accounts might improve the housewife's memory in giving the schedule figures, control schedules were obtained before the accounts were started, covering the expenditures of the preceding year in the case of twenty-two of the farm families. Schedule information was also obtained from forty-one additional farm families not keeping accounts, who were selected for purposes of comparison. A further study has been initiated along this line covering a large number of cases for the purpose of testing the feasibility of using a combined method in getting data for this type of investigation.

Another study made by the Bureau of present consumption habits deals with families receiving mothers' pensions. Through the Bureau of Public Welfare of the District of Columbia, complete yearly accounts were secured from forty-five families. As a result of the analysis of these data valuable light has been thrown upon the adequacy of these pensions.

The Bureau is preparing and testing a schedule to be used in an investigation of the standards of living of mountain families living in the Southern Appalachian region. Several other bureaus of the Department of Agriculture are coöperating in this study which has for its object the development of a sound economic, social, and educational program for this region.

In order to facilitate the comparison of the expenditures of one family with those of others, family measurement scales are being devised by the Bureau for farm and city families. These scales indicate the relative expenditure of persons of different age and sex, the expenditure of the average man being taken as unity. Using the data obtained in the various studies of family expenditure, separate scales are being devised for food, clothing, and other items in the family budget. The scales for the various items are to be combined into a single scale covering all expenditures. By the use of such a scale in studies of family living the number of "adult-male units" to which each family is equivalent is found, and the total family expenditure is then reduced to the expenditure per "adult-male unit" and compared with similar figures for other families.

The studies of changes which have occurred in recent years in the consumption of various products and services by different groups of the population, and in their methods of purchasing, also have as their object the improvement of standards of living and the adjustment of production to meet consumer demand.

The Bureau started its investigations in this field with a study of the changes over the past five years in consumer-demand for cotton in clothing and in household articles. This study was undertaken as part of the program of the Department of Agriculture to aid the situation in the cotton market. It had been evident that consumers were shifting from cotton to silk or rayon for certain articles, but the extent of these changes and the types of articles most affected had not been known. Through the coöperation of teachers in colleges and universities, extension workers and club women, information as to these changes was obtained from over one thousand men and women representing all sections of the country.

The function of investigations concerning the management of the family income is to obtain information and to devise methods which will aid the individual homemaker in the wise use of the family income. An important aspect of this work is the preparation of forms for planning household budgets and keeping accounts. The need for satisfactory forms has been keenly felt, both by teachers of family budgeting and accounting and by research workers studying standards of living. Since the form of account-book most widely used to date has proved unsuccessful with a great many families, a number of alternative forms were prepared by the Bureau and tested out with farm and city homemakers. As a result of this study, two types of account-books were selected. One is suitable for use by homemakers who have considerable experience or aptitude in household accounting and are able to plan and record their expenditures without personal assistance. The other form, which is exceedingly simple, is prepared for homemakers who cannot be expected to do more than enter their expenditures in journal fashion without classification. This form has been used by the Bureau in its studies of standards of living in which the homemaker is assisted by a field agent in keeping her accounts, and sends them to the Bureau for summary and analysis.

In coöperation with a committee of extension workers of the state agricultural colleges, the Bureau is preparing an account-book suitable for use with farm homemakers. As a further aid to homemakers in handling the family finances, a leaflet and bulletin have been printed presenting directions for planning budgets and keeping accounts. Suggested budgets are prepared for farm families of various sizes and incomes, based upon the average expenditures of families whose consumption habits conform to existing standards of health.

Food Consumption Investigations. The investigations in the field of food consumption are made with a view to improving the diet of the American people, reducing the cost of this diet, and aiding in the adjustment of food production, manufacturing, and retailing to meet the needs of the consumer. Up to the present time, these investigations have covered the present food consumption habits of six different groups of the population. In each of these studies the quantities and cost of the various foods consumed have been determined and the adequacy of the diet has been checked against standards of good nutrition.

Three of these studies have formed a part of the larger investigations of standards of living made by the Bureau. From the study of farm families made in cooperation with the Bureau of Agricultural Economics, the schedules of 2400 families from nine states were used in the dietary analysis, and part of the records in the studies of business and professional families and of families receiving mothers' pensions were used. In considering the diet of farm families, the food furnished by the farm is included, and the money value is estimated in terms of local market price.

The other three studies of food consumption made deal with institutional groups rather than with families.

Through the coöperation of the home economics departments of various state colleges, records were obtained of the food consumed by college students in fifty-eight residence halls, and similar information was obtained from a boys' preparatory school. The results of these two studies are presented in bulletins, and have been compared with similar data from twelve other studies of the food consumption of student groups.

The remaining study covers one hundred and eleven children's institutions from various parts of the country, from which records of food consumption were obtained for one week. In four of these institutions, detailed individual dietary studies were made with eighty children over a three-day period, and in coöperation with the United States Public Health Service each child was given a physical examination. These data are being examined to see what correlation can be found between the diet and health of the child.

A special study has been made of the various dietary scales and standards which have been used for measuring the nutritive requirements of persons of different age, sex, and activity, and a new double scale has been prepared which embodies the more recent findings in nutrition.

In order to proceed with the collection and analysis of new data on food consumption, considerable work has been done in improving research methods. The study of the comparative reliability of family expenditure data collected by means of schedules and household accounts has included consideration of food consumption data, and methods have been devised for obtaining accurate records of food consumption.

Through the courtesy of the Merrill-Palmer School the Bureau has had access to data which have been collected in a detailed dietary study of the restricted community, Gross Ile, near Detroit. These data have been studied statistically to determine the extent to which qualitative data may be correlated with data on physical status. This has thrown considerable light on the types of data which are valuable to collect in similar studies.

The Bureau has also developed a short-cut method for calculating the nutritive value of a diet, in which the weighted average compositions of nine groups of foodstuffs are used instead of the composition of each of the 125 separate foodstuffs included in the diet.

Household Production Studies. Research in the field of household production comprises three separate lines of work: Studies of the present work of various types of homes, efficiency studies of homemaking tasks, and studies of the economic value of housewives' services. The first problem confronting the Bureau in undertaking household production studies was to get information as to the present situation in various types of homes, for in spite of the importance of the work of the household, little information is available in regard to this phase of economic life.

A study is being made of the kind and amount of work now carried on by farm, village, and city housewives, and of the help which they receive from other members of the family and from paid workers. This information is being secured by means of time records kept by the homemakers for the seven days of a "typical" week. Over one thousand records have so far been received, largely from rural homemakers reached by the extension services of state agricultural colleges, and an equal number have been obtained by the agricultural experiment stations of several states, working in coöperation with the Bureau. The study of city homes is being continued with housewives who are college graduates, in order that comparisons may be made of homes of varying economic and social status.

The results of this study indicate the extent to which homemakers are overworked or underworked in various types of homes and at various periods in the family's life, and the extent to which labor-saving equipment and the use of commercial products and services are reducing the time required for housekeeping. Since the records kept by the homemakers cover all of their activities throughout the twenty-four hours of each day, the results also throw light on the amount of leisure which they enjoy and the ways in which they use this leisure. This information is useful to many agencies as a basis for future research, education, and experimentation designed to aid the homemaker in reducing the work of housekeeping and in coördinating other work and interests with her homemaking responsibilities. Various articles have appeared presenting the preliminary results of the study.

From several of the studies of family consumption made by the Bureau, information is available concerning the kind of household equipment owned by the families, the amount of paid household service which they have employed and the extent to which they have made use of commercial laundries. This information is being compiled in special reports with similar data obtained in the studies of household production.

The function of efficiency studies of homemaking tasks is to determine the most efficient methods of performing such tasks and the time and energy required for such performance. Of the many tasks of the homemaker, none is as important as the care of children. The first work in this field was an investigation of the time required for the care of small children in the home according to modern standards of adequate care. Twenty-four mothers with babies under one year coöperated in the study, keeping detailed records of the time which they and other members of the household spent in caring for the children. An extension of this study deals with children from one to three years old which will enable the drawing of comparisons of the time required for care in the home with the time and money outlay required when the child attends a nursery school.

The Bureau also is engaged in determining efficient methods of work in connection with the tasks of preparing meals, dishwashing, and other routine housework. In order to aid the homemaker in organizing her work, forms and directions have been devised and distributed for making a schedule or plan of housework.

The studies of the economic value of the work of the housewife are being made with a view toward encouraging a greater appreciation of the value of her work, and giving her a more definite basis for choosing the tasks on which she will spend her time. In placing an economic value on the homemaker's work, the cost of paid substitutes for her unpaid labor is used. Two types of substitute are available, one the services of paid workers in the home, and the other, the services or goods of the commercial agency.

Both of these methods are being employed by the Bureau. Using the figures on the time spent in various tasks by the homemakers coöperating in the studies of the present work of rural and city households, the economic contribution of homemakers to the national income is being computed by multiplying the hours spent in each task by the hourly wage or salary received by cooks, seamstresses, nurses, and other paid workers whose quality and speed of work are comparable to the housewives'. The second method, using the cost of the commercial substitute, has also been used in a study with a small group of homemakers, in order to determine in which tasks their time has the greatest economic value.

CHAPTER III

ORGANIZATION

The Bureau of Home Economics is the only Bureau in the Department of Agriculture which bears the distinction of having at its head a woman chief. As it has no regulatory duties, and its function is the prosecution of scientific research in home economics, the administrative organization is based upon the types of investigation conducted. These are discussed in detail in this chapter.

All of the employees of the Bureau are in the classified service and are appointed through examination and recommendation by the Civil Service Commission. The work is concentrated in Washington and there is no field service.

General Administration. The administrative head of the Bureau is the Chief, who supervises the activities of the whole Bureau. Included in the general administrative offices are the Business Operations Section, the Information Section, and the Library. The Bureau is divided into three divisions as follows: Division of Foods and Nutrition, Division of Clothing and Textiles, and the Division of Economics. Researches are made under the appropriate division, although in some cases projects are handled by more than one division coöperatively.

The Chief's Office Proper. This office consists of the Chief, an assistant to the chief, and a secretary. In addition to directing the work of the Bureau, the Chief supervises the work of the Division of Foods and Nutrition in the way of approval of plans for investigations and general check of the results of such investigations. In respect to the latter duty, she depends upon the specialists working under her in the Division of Foods and Nutrition for technical details. The Chief, who keeps in touch with work in related fields, maintains contact with the state experiment stations and other research groups in order that coöperative lines of work may be developed. She also maintains contact with women's organizations for the purpose of providing means whereby the results of experimental work may be disseminated.

The assistant to the chief acts for the Chief on special committees, and handles subject matter assignments, such as the preparation of popular bulletins, chart sets, and radio talks. She also answers special letters dealing with child nutrition, care, and training.

The secretary handles the general secretarial work for the office.

Business Operations Section. The business operations of the Bureau which are usually found in the office of the Chief Clerk are centered in the Business Operations Section. This Section, under the immediate supervision of the Chief, is headed by a junior administrative assistant, who is responsible for the business and personnel activities of the Bureau. Personnel matters include classification of employees, compensation, retirement, and efficiency ratings. This officer also keeps records of appointments, transfers, and promotions. An assistant senior clerk is charged with general supervision of all Bureau property.

There are three units in the Business Operations Section: Stenographic, Mails and Files, and Messengers, Laborers, and Charwomen. The Stenographic Unit consists of unassigned stenographers who handle the stenographic work of the several divisions. An assistant clerk has general charge of the Bureau files. The Messengers, Laborers, and Charwomen Unit consists of five persons who perform messenger and janitor service.

Information Section. The Information Section has general charge of the editorial work, information service, and correspondence of the Bureau. The personnel of this Section comprises one associate home economics specialist, one assistant home economics specialist, and three stenographers. The Information Service reviews and edits all publications of the Bureau, prepares for approval by the Chief all press and radio material and the general correspondence of the Bureau, and maintains contacts with writers, magazine editors, and scientific agencies. The correspondence is quite extensive, and for the fiscal year ending June 30, 1929, totalled fifteen thousand letters, a number of which required special research. This office maintains a complete file of all photographs made for the Bureau, develops charts and exhibit material, and compiles bibliographical data on home economics activities.

Library. A branch of the main library of the Department of Agriculture is maintained in the Bureau under the supervision of a junior librarian, aided by a minor library assistant. It contains approximately 2500 volumes upon the subject matter of home economics in addition to the leading home economics periodicals. While the library is primarily for the use of the Bureau staff, it is used by visiting home economics workers and other interested persons. The library prepares lists of references on specific subjects in the field of home economics.

Food and Nutrition Division. All of the experimental work in foods and nutrition is conducted in the Food and Nutrition Division. The Chief of the Bureau also acts as Chief of this Division. There are four sections, as follows: Nutrition Studies Section, Food Utilization Section, Food Composition Section, and the Refrigeration Section. Projects undertaken by the Bureau in food work fall under the section which is most closely related to the particular inquiry.

Nutrition Studies Section. The function of the Nutrition Studies Section is to carry on research in the animal laboratory for the purpose of determining the vitamin content of food materials. In addition, it studies the effects of various types of processing upon the vitamin content of foods.

This work is directed by a chemist who has general charge of the research in nutrition. The personnel of the section includes an assistant chemist, a junior home economics specialist, two junior scientific aids, a laboratory helper, a stenographer, and a charwoman.

Food Utilization Section. The studies of the utilization of foods and food products which are made in experimental cooking, baking, and canning laboratories are for the purpose of testing "the cooking quality and palatability of food produced under varying conditions, of determining more satisfactory uses for well-known foods, and to find uses for new foods." When special food problems arise which demand study they are set up as special projects.

The chief project of the Food Utilization Section is the study of meats, which has been running for four years. It also makes studies primarily in the field of utilization, preparation, and care of the food in the household. The personnel consists of two associate home economics specialists, two junior home economics specialists, one junior scientific aid, and one minor scientific helper. At present there is no chief of this Section.

Food Composition Section. The compilation of data on the chemical composition of foods is concentrated in the Food Composition Section. This work is conducted for the purpose of preparing tables to be used in dietary studies, and when completed will supersede Dr. Atwater's early work. A home economics specialist is in charge of the work and exercises general direction over the personnel, which includes an associate home economics specialist, two scientific aids, an assistant accountant, and one clerk.

Refrigeration Section. With the coöperation of companies manufacturing refrigerators and the industries concerned with refrigeration the Bureau has set up a project dealing with refrigeration under the Refrigeration Section. An instrument room is maintained for these experiments, which include the use of the potentiometer, galvanometer, and other accessories. The function of the investigatory work is to compare the various methods of refrigeration as to cost of operation, temperatures maintained, relative humidity, and keeping of food. Bacteriological and microscopical work is conducted on the problem of food spoilage and hydrogen-ion determinations are carried out. There are three persons in the Section, two physicists who have charge of the work related to physics, and a junior bacteriologist who makes the bacteriological and chemical tests.

Textiles and Clothing Division. All research projects in textiles and clothing are conducted in the Textiles and Clothing Division, except those dealing with clothing expenditures. These investigations comprise studies of the utilization of textile fibers produced in this country, and the improvement of homemakers' standards in connection with the selection, maintenance, and use of clothing and household textiles. In the Division there are two sections: the Textile Maintenance and Utilization Section, and the Clothing Design Section. The former has two units, a Chemical Aspect Unit, and a Physical Aspect Unit.

At the head of the Division is a senior chemist, who plans and supervises the research and the preparation of the results of such researches. The senior chemist maintains contacts with industrial laboratories, state experiment stations, and other agencies in order that duplication of effort may be prevented. This contract also enables the working out of coöperative lines of inquiry.

A secretary, who performs the usual secretarial duties, is attached to the senior chemist's office.

Chemical Aspect Unit. In the Chemical Aspect Unit the chemical phase of the textile utilization and maintenance work is prosecuted. Such problems as the effect of temperatures and washing reagents upon the washing process and upon the chemical composition of fabrics, the determination of the value of various starches and their ingredients in sizing mixtures as regards the stiffness and pliability of fabrics, and other chemical phases of the research are studied by the personnel of this Unit. Three assistant chemists are charged with this work.

Physical Aspect Unit. The other line of experimentation is the physical, which is investigated by the staff of the Physical Aspect Unit. This Unit studies the physical properties of cotton fabrics composed of cotton of various grades and character and the physical characteristics of wool fabrics. Physical researches, such as the testing of tensile strength, the heat conductance, and the air resistence of cotton and wool fabrics, are involved. The work also consists of the developing and calibration of instruments for making these tests.

An associate physicist, an assistant physicist, and a cotton technologist make up the personnel of this Unit.

Clothing Design Section. The Clothing Design Section is engaged in developing experimentally new designs for clothing and household textiles. It also critically observes articles in actual use for the purpose of determining their practicability. A large portion of the work is devoted to developing designs for children's clothing.

The personnel includes two assistant home economics specialists, one junior home economics specialist, and a junior domestic attendant.

Economics Division. Research projects in the economics of the home are conducted in the Economics Division, which is organized into four sections: Standards and Cost of Living, Household Production, Food Economics, and Statistics. The Statistical Section serves as a pool for the three research divisions. Studies of the consumption and cost of food, clothing, and other items in the family budget, management of income, and the work of the household are made in this Division.

The Division is in charge of a principal economist, who is responsible for all of the work, subject to the general supervision of the Chief of the Bureau. She supervises the planning and execution of research projects, the publication of bulletins, articles, and reports, and the dissemination of information relating to the economics of the home. She maintains contact with state experiment stations and other agencies working in their field, and arranges for coöperative studies where comparability of results or coördination of work is desirable.

A secretarial clerk and a senior stenographer are connected with the principal economist's office, and serve the needs of the research staff of the Division.

Standards and Cost of Living Section. The Standards and Cost of Living Section considers the content, adequacy, and cost of family living, the management of family income, and the purchasing problems of consumers. The expenditures of farm and other types of families and their methods of buying are studied by means of schedule information and household accounts obtained from homemakers. The effect of size of income, the number and ages of children, and other factors on the consumption and purchasing habits are determined. Suggested budgets and directions and forms for household budgeting and accounting are prepared to assist the individual homemaker in the wise use of the family income.

The personnel includes a senior economist, in charge, a statistical clerk, and an assistant clerk.

Household Production Section. The Household Production Section considers the organization and efficiency of the work of the home. Problems involved in the research activity of this Section include the kind and amount of work now done in farm and other types of households, the extent to which homemakers are underworked or overworked, the possibilities of reducing the time spent in various tasks by labor-saving equipment and more efficient methods of work, the comparative costs and advantages of home and commercial production, and similar problems.

The principal economist in charge of the Division acts as head of this Section, and two junior economists and an assistant statistical clerk complete the personnel.

Food Economics Section. The investigations in the Food Economics Section deal with the food consumption habits of various groups in the population, and the purchasing and cost of food from the consumer's standpoint. Studies are made of the food consumed in farm and other types of homes and in institutions, and the adequacy of these dietaries is calculated. Factors causing changes in the amount and form of various foodstuffs consumed by different groups are examined. The effect of the food purchasing habits of housewives on the cost of food, the relation between the number of persons served to the cost of meals, and similar problems are studied.

A senior food economist, a senior scientific aid, and an assistant scientific aid make up the personnel of the Section.

Statistical Section. The Statistical Section comprises a pool of statistical clerks who are assigned to studies in the other three sections as the demands of the work require. The personnel includes one assistant clerk and four junior clerks.

APPENDIX 1

OUTLINE OF ORGANIZATION

EXPLANATORY NOTE

The purpose of the Outlines of Organization in this series of Monographs is to show in detail the organization and personnel of the several services of the national government to which they relate. They have been prepared in accordance with the plan followed by the President's Commission on Economy and Efficiency in its outlines of the organization of the United States government.[1] They differ from those outlines, however, in that whereas the Commission's report showed only organization units, the presentation herein has been carried far enough to show the personnel embraced in each organization unit.

These outlines are of value not merely as an effective means of making known the organization of the several services. If kept revised to date, they constitute exceedingly important tools of administration. They permit the directing personnel to see at a glance the organization and personnel at their disposal. They establish definitely the line of administrative authority and enable each employee to know his place in the system. They furnish the essential basis of plans for determining costs by organization division and sub-division. They afford the data for a consideration of the problem of classifying and standardizing personnel and compensation. Collectively they make it possible to determine the number and location of organization units of any particular kind, such as laboratories, libraries, blueprint rooms, or other plants, to what services attached and where located, or to determine what services are maintaining stations at any city or point in the United States. The Institute hopes that upon the completion of the present series, it will be able to prepare a complete classified statement of the technical and other facilities at the disposal of the government. The present monographs will then furnish the details regarding the organization, equipment, and work of the institution so listed and classified.

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[1] 62 Cong., H. doc. 458, 1912, 2 vols.

OUTLINE OF ORGANIZATION
BUREAU OF HOME ECONOMICS
DEPARTMENT OF AGRICULTURE
MARCH 12, 1930

Organization Units: *Classes of Employees*	*Number*	*Annual Salary Rate*
1. General Administration		
1. Office Proper of the Chief		
Chief	1	$7,000
Assistant to the Chief	1	3,400
Secretary	1	2,300
2. Business Operations Section		
Administrative Assistant	1	2,600
Senior Clerk	1	2,300
File Clerk	1	1,740
Assistant Clerk-Stenographer	1	1,620
Junior Stenographer	1	1,440
Laborer	1	1,380
Messenger	1	1,080
Charwoman	1	900
Charwoman	1	1,080
3. Information Section		
Associate Home Economics Specialist	1	3,600
Assistant Home Economics Specialist	1	2,600
Clerk-Stenographer	1	1,920
Clerk-Stenographer	1	1,740
Clerk-Stenographer	1	1,620
4. Library		
Junior Librarian	1	2,300
Minor Library Assistant	1	1,260
2. Food and Nutrition Division		
1. Nutrition Studies Section		
Chief	1	4,600
Associate Chemist	1	3,200
Assistant Chemist	1	2,600
Junior Home Economics Specialist	1	2,200

Organization Units: Classes of Employees	*Number*	*Annual Salary Rate*
Junior Scientific Aide	1	$1,560
Senior Stenographer	1	1,620
Laboratory Helper	1	1,500
2. Refrigeration Section		
Associate Physicist	1	3,000
Assistant Physicist	1	2,700
Junior Bacteriologist	1	2,000
3. Food Utilization Studies Section		
Associate Home Economics Specialist	3	3,200
Junior Home Economics Specialist	2	2,000
Junior Scientific Aide	1	1,440
Minor Scientific Aide	1	1,200
4. Food Composition Section		
Chief	1	3,800
Associate Home Economics Specialist	1	3,200
Scientific Aide	1	1,800
Assistant Scientific Aide	1	1,620
Senior Statistical Clerk	1	2,000
Statistical Clerk	1	1,800
Junior Statistical Clerk	1	1,440
3. Economics Division		
1. Office of the Chief of Division		
Chief (also Chief of Household Production)	1	5,600
Secretary-Clerk	1	1,860
Senior Stenographer	2	1,620
2. Household Production Section		
Junior Home Economics Specialist	1	2,100
Junior Home Economics Specialist	1	2,000
Assistant Clerk	1	1,620
3. Food Economics Section		
Chief	1	4,600
Assistant Home Economics Specialist	1	2,200
Assistant Scientific Aide	1	1,680
4. Standards and Cost of Living Section		
Chief	1	4,600
Statistical Clerk	1	1,980
Assistant Clerk	1	1,740

Organization Units: *Classes of Employees*	*Number*	*Annual Salary Rate*
5. Statistical		
Assistant Clerk	1	$1,620
Junior Statistical Clerk	1	1,500
Junior Statistical Clerk	3	1,440
4. Textiles and Clothing Division		
1. Office of the Chief of Division		
Chief	1	5,000
Secretary-Clerk	1	1,620
2. Clothing Design Section		
Assistant Home Economics Specialist	1	2,700
Assistant Home Economics Specialist	1	2,600
Dressmaker	1	1,320
3. Textile Maintenance and Utilization Units		
Associate Physicist	1	3,200
Assistant Physicist	1	2,600
Assistant Chemist	1	2,700
Assistant Chemist	2	2,600
Junior Cotton Technologist	1	2,000

APPENDIX 2

CLASSIFICATION OF ACTIVITIES

EXPLANATORY NOTE

The Classifications of Activities in this series have for their purpose to list and classify in all practicable detail the specific activities engaged in by the several services of the national government. Such statements are of value from a number of standpoints. They furnish, in the first place, the most effective showing that can be made in brief compass of the character of work performed by the service to which they relate. Secondly, they lay the basis for a system of accounting and reporting that will permit the showing of total expenditures classified according to activities. Finally, taken collectively, they make possible the preparation of a general or consolidated statement of the activities of the government as a whole. Such a statement will reveal in detail, not only what the government is doing, but the services in which the work is being performed. It is hardly necessary to point out the value of such information in planning for future work and in considering the problem of the better distribution and coördination of the work of the government. The Institute contemplates attempting such a general listing and classification of the activities of the government upon the completion of the present series.

CLASSIFICATION OF ACTIVITIES

1. Food and Nutrition Investigations
    1. Composition of foods
    2. Vitamin content of foods
    3. Dietaries
    4. Food-utilization
    5. Refrigeration.

2. Textile and Clothing Research
    1. Home laundering studies
    2. Hygienic aspects of clothing
    3. Cotton and wool utilization
    4. Experimental clothing design
    5. Designs for household articles.

3. Research in Economics of the Home
    1. Standards and cost of living
    2. Food economics
    3. Household production.

APPENDIX 3

PUBLICATIONS[1]

One of the major activities of the Bureau of Home Economics since its organization has been the publication of information, both technical and popular, pertaining to home economics. Nearly all of the publications are issued in the regular series maintained by the Department of Agriculture, which comprise Technical Bulletins, Circulars, Miscellaneous Publications, Farmer's Bulletins, Department Leaflets, articles in the Yearbook of the Department of Agriculture, and articles in the Journal of Agricultural Research. Certain charts prepared by the Bureau and a family account book are printed independently.

Annual Report. The Annual Report of the Chief of the Bureau of Home Economics forms a part of the Annual Report of the Secretary of Agriculture in the volume of Annual Reports of the Department. This report, which is also issued in separate form, contains a brief summary statement of the operations of the Bureau for the fiscal year.

Technical Bulletins. The Technical Bulletins are a series of technical publications of the various bureaus in the Department of Agriculture which contain results of scientific research. Intended primarily for specialists and researchers, they are of a technical nature. Up to 1927 Technical Bulletins were known as Department Bulletins.

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[1] Most of the current publications of the Bureau of Home Economics are furnished free, upon application, by the Office of Information of the Department of Agriculture. They are also sold, when available, by the Superintendent of Documents, Government Printing Office, Washington, D. C. Lists of new publications are issued monthly and sent free to persons requesting them. A check list of all publications of the Bureau of Home Economics from July, 1923, to January, 1930, has been prepared by the Bureau of Home Economics and is available upon application to the Bureau.

Circulars. The Circulars include those publications of the same general character as the Technical Bulletins, although they are less technical. This series was begun by the Department of Agriculture in 1919, being designated as Department Circulars up to 1927.

Miscellaneous Publications. These miscellaneous publications were formerly labelled Miscellaneous Circulars and comprise publications not falling directly under any of the other departmental series.

Farmer's Bulletins. The Bureau of Home Economics contributes regularly to the series of Farmer's Bulletins, which were first published in 1889. They are distributed generally and are written in popular style so that they are easily understood by laymen. Within the past few years the Bureau has made a special attempt to make both the Farmer's Bulletins and the Department Leaflets, attractive in set-up, and some of them being artistically illustrated, are quite unlike the usual government pamphlet.

Department Leaflets. Many of the specific suggestions on food and clothing made by the Bureau are published in the Department Leaflet Series, begun in 1927. Popularly written, they contain information of the same general character as that found in the Farmer's Bulletins. As the Leaflets are limited to eight pages the subject matter is presented briefly but concisely.

Yearbook. Reports and papers of the various bureaus in the Department of Agriculture, which popularly discuss problems of special interest and instruction, are found in the Yearbook of the Department of Agriculture. The Bureau of Home Economics contributes articles regularly to it upon the subject matter of home economics. The Yearbook's articles are also printed as separates.

Journal of Agricultural Research. The Journal of Agricultural Research, published semi-monthly and containing technical articles on the results of investigations conducted by the bureaus of the Department of Agriculture and the state experiment stations, frequently carries articles on the several phases of home economics which are contributed by the Bureau of Home Economics. Reprints are issued of articles appearing in the Journal. The subscription price is $4 per year.

Charts. Charts prepared by the Bureau are not published in any of the regular Department series, but are independent publications which are sold by the Superintendent of Documents. An account book for the keeping of a record of family expenditures is also independently published.

Official Record. A weekly periodical, The Official Record, which contains news of the work of the bureaus in the Department is issued by the Department of Agriculture. Its subscription rate is fifty cents a year.

Other Publications. In addition to the official publications members on the staff of the Bureau contribute articles covering a wide variety of subjects to many periodicals, such as the Journal of Home Economics, Refrigerating Engineering, Survey Graphic, Commerce and Finance, American Food Journal, Agricultural Engineering, and others.

APPENDIX 4

LAWS

(A) INDEX TO LAWS

Organization	
Department of Agriculture (independent establishment)	R. S., Sec. 520
(Executive department)	25 Stat. L., 659
Bureau of Home Economics (by Agricultural appropriation act of February 26, 1923)	42 Stat. L., 1315
Personnel	
Officers and employees authorized	R. S., Sec. 523
Powers and Duties	
Secretary of Agriculture	R. S., Secs. 520, 523, 526 25 Stat. L., 659
Activities	
General	R. S., Sec. 526
Appropriations	
For fiscal year 1895	28 Stat. L., 271
For fiscal year 1930	45 Stat. L., 1215

(B) COMPILATION OF LAWS

R. S., Sec. 520—Establishment of the Department of Agriculture—[Act of May 15, 1862, Sec. I; 12 Stat. L., 387].

Sec. 520. There shall be at the seat of Government a Department of Agriculture, the general design and duties of which shall be to acquire and to diffuse among the people of the United States useful information on subjects connected with Agriculture, in the most general and comprehensive sense of that word. . . .

R. S., Sec. 523—Officers and Employees—[Act of May 15, 1882, Sec. 4; 12 Stat. L., 388].

Sec. 523. The Commissioner [Secretary [1]] of Agriculture shall appoint . . . such other employes as Congress may from time to time provide, with salaries corresponding to the salaries of similar officers in other Departments of the Government; and he shall, as Congress may from time to time provide, employ other persons for such time as their services may be needed, including chemists, . . . and other persons skilled in the natural sciences pertaining to agriculture.

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[1] Acts of February 9, 1889, and March 2, 1889.

R. S., Sec. 526—Duties of Commissioner [Secretary[1]]—[Act of May 15, 1882, Sec. 3; 12 Stat. L., 387].

Sec. 526. The Commissioner [Secretary[1]] of Agriculture shall procure and preserve all information which he can obtain by means of books and correspondence, and by practical and scientific experiments, accurate records of which experiments shall be kept in his office, by the collection of statistics, and other appropriate means within his power; . . .

1889—Act of February 9, 1889 (25 Stat. L., 659)—An Act To enlarge the powers and duties of the Department of Agriculture and to create an Executive Department to be known as the Department of Agriculture.

[Section I]. That the Department of Agriculture,[2] shall be an Executive Department, under the supervision and control of a Secretary of Agriculture, who shall be appointed by the President, by and with the advice and consent of the Senate; and section one hundred and fifty-eight of the Revised Statutes is hereby amended to include such Department, and the provisions of title four of the Revised Statutes, including all amendments thereto, are hereby made applicable to said Department.

* * * * *

Sec. 4. That all laws and parts of laws relating to the Department of Agriculture now in existence, as far as the same are applicable and not in conflict with this act, and only so far, are continued in full force and effect.

1894—Act of August 8, 1894 (28 Stat. L., 264, 271)—An Act Making appropriations for the Department of Agriculture for the fiscal years ending June thirtieth, eighteen hundred and ninety-five.[3]

* * * * *

NUTRITION: To enable the Secretary of Agriculture to investigate and report upon the nutritive value of the various articles and commodities used for human food, with special suggestion of full, wholesome, and edible rations less wasteful and more economical than those in common use, ten thousand dollars; and the agricultural experiment stations are hereby authorized to co-operate with the Secretary of Agriculture in carrying out said investigations in such manner and to such extent as may be warranted by a due regard to the varying conditions and needs of the respective States or Territories, and as may be mutually agreed upon; and the Secretary of Agriculture is hereby authorized to require said stations to report to him the results of any such investigations which they may carry out, whether in co-operation with said Secretary of Agriculture or otherwise.

[1] Acts of February 9, 1889, and March 2, 1889.

[2] See act of March 2, 1889.

[3] Obsolete. Initial appropriation.

1923—Act of February 26, 1923 (42 Stat. L., 1289, 1315)—An Act Making appropriations for the Department of Agriculture for the fiscal year ending June 30, 1924, and for other purposes.

* * * * *

BUREAU OF HOME ECONOMICS[4]

1929—Act of February 26, 1929 (45 Stat. L., 1189, 1215)—An Act Making appropriations for the Department of Agriculture for the fiscal year ending June 30, 1930, and for other purposes.

* * * * *

BUREAU OF HOME ECONOMICS

Salaries and General Expenses

For necessary expenses for general administrative purposes, including the salary of chief of bureau and other personal services in the District of Columbia, $18,500.

To enable the Secretary of Agriculture to investigate the relative utility and economy of agricultural products for food, clothing, and other uses in the home, with special suggestions of plans and methods for the more effective utilization of such products for these purposes, and to disseminate useful information on this subject, including the employment of labor in the city of Washington and elsewhere, supplies, and all other necessary expenses, $149,000.

Total, Bureau of Home Economics, $167,500, of which amount not to exceed $157,000 may be expended for personal services in the District of Columbia.

[4] Authorizing creation of the Bureau.

APPENDIX 5

FINANCIAL STATEMENT

EXPLANATORY NOTE

Statements showing appropriations, receipts, expenditures, and other financial data for a series of years constitute the most effective single means of exhibiting the growth and development of a service. Due to the fact that Congress has adopted no uniform plan of appropriations for the several services and that the latter employ no uniform plan in respect to the recording and reporting of their receipts and expenditures, it is impossible to present data of this character according to any standard scheme of presentation. In the case of some services the administrative reports contain tables showing financial conditions and operations of the service in considerable detail; in others financial data are almost wholly lacking. Careful study has in all cases been made of such data as are available, and the effort has been made to present the results in such a form as will exhibit the financial operations of the services in the most effective way that circumstances permit.

BUREAU OF HOME ECONOMICS

Appropriations and Expenditures, Fiscal Years 1924-1929, Inclusive, and Appropriations, Fiscal Year 1930

	1924		1925		1926		1927	
	Appropriation	Expenditure	Appropriation	Expenditure	Appropriation	Expenditure	Appropriation	Expenditure
Salaries	$21,760.00	$20,153.62	$27,244.00	$27,143.75	$27,244.00	$27,134.58	$27,244.00	$27,239.31
General Expenses	50,000.00	49,559.47	79,780.00	78,476.26	90,000.00	87,800.00	100,000.00	99,657.85
Total	$71,760.00	$69,713.09	$107,024.00	$105,620.01	$117,244.00	$114,934.58	$127,244.00	$126,897.16

	1928		1929		1930	
	Appropriation	Expenditure	Appropriation	Expenditure	Appropriation	Expenditure
Administrative Expenses	$17,281.00	$17,239.19	$18,321.00	$18,232.24	$18,500.00	......
Investigational Work	109,963.00	109,946.07	129,716.00	129,176.31	149,000.00	......
Total	$127,244.00	$127,185.26	$148,037.00	$147,408.55	$167,500.00	......

APPENDIX 6

BIBLIOGRAPHY[1]

EXPLANATORY NOTE

The bibliographies appended to the several monographs aim to list only those works which deal directly with the services to which they relate, their history, activities, organization, methods of business, problems, etc. They are intended primarily to meet the needs of those persons who desire to make a further study of the services from an administrative standpoint. They thus do not include the titles of publications of the services themselves, except in so far as they treat of the services, their work and problems. Nor do they include books or articles dealing merely with technical features other than administrative of the work of the services. In a few cases explanatory notes have been appended where it was thought they would aid in making known the character or value of the publication to which they relate.

After the completion of the series the bibliographies may be assembled and separately published as a bibliography of the Administrative Branch of the National Government.

GENERAL SOURCES

Kneeland, Hildegard.[2] The field of research in economics of the home. (Journal of Home Economics, v. 17 (1925) : 15-19).

O'Brien, Ruth.[2] The program of textile research in the Bureau of Home Economics. (Journal of Home Economics, v. 22 (1930) : 281-87).

Stanley, Louise.[2] A greeting to the farm home from Dr. Louise Stanley, Chief of the Bureau of Home Economics. (Farmer's Wife, v. 28 (1925) : 50).

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[1] Compiled by Adelaide R. Hasse.

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Conover, Milton. The Office of Experiment Stations; its history, activities and organization. (Baltimore), 1924. 178 pp.

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